THE RUBBER AGE

ESTABLISHED 1917

COVERS ALL PHASES OF THE PRODUCTION AND MARKETING OF CRUDE RUBBER AND THE MANUFACTURE AND DISTRIBUTION OF RUBBER GOODS

Vol. 36 DECEMBER, 1934 No. 3

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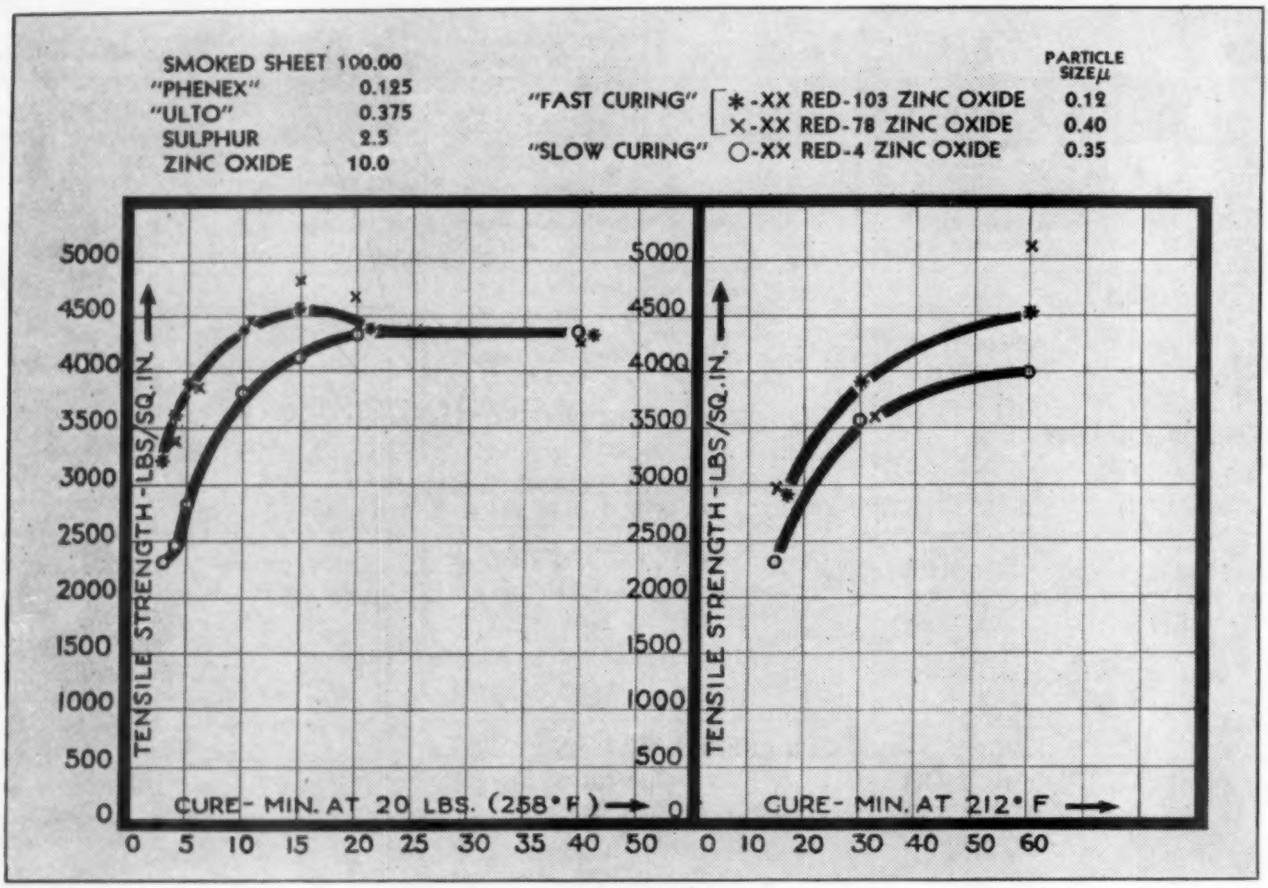
No. 33

of a series of charts showing a comparison of "FAST" and "SLOW" curing zinc oxides with typical accelerators.



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THE NEW JERSEY ZINC COMPANY 160 FRONT STREET NEW YORK

THE RUBBER AGE

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A Water Bath Having Submerged Individual Sample-Containers for the

Accelerated Aging of Rubber in Air

By William L. Holt and Archibald T. McPherson

Abstract

Small air ovens, submerged in a thermostatically-controlled water bath serve as individual containers for the accelerated aging of rubber samples in air, and thus obviate the possibility of contamination from adjacent samples. Air in the containers is changed about once or twice an hour by convection. The insulation and distribution of heating elements are such that the temperature of the water in the water bath and that of the air in the air bath is each kept constant to within 0.2° or 0.3° C without mechanical stirring. The temperature of the air is about 0.5° below that of the bath, hence in conducting the usual test the bath is operated at 70.5° C.

IMPROVED equipment for conducting the familiar Geer aging test on rubber has recently been installed at the National Bureau of Standards. This equipment consists of thermostatically-controlled water baths in which small air ovens are submerged. Each oven serves for the accelerated aging of samples of a single composition and thus avoids the possibility of contamination which may be an important factor when samples of different compositions are aged in the same oven. The apparatus differs from that described recently by Milligan and Shaw[1] in that individual sample containers are employed and air circulation is obtained by convection.

A photograph of one water bath is shown in Figure 1.

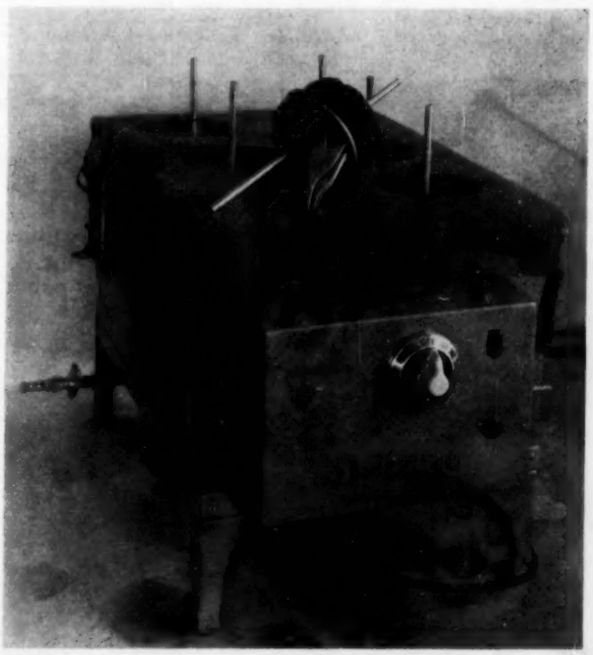


FIG. 1. A water bath with individual containers with the cover of one container removed to show method employed in holding samples.

Publication Approved by the Director of the Bureau of Standards of the U. S. Department of Commerce.

[1] *J. Sci. Instruments 11*, 10-14 (Jan. 1934).

In the illustration one container is shown open with test strips attached to the cover. The water bath is of a common size and type, with inside dimensions of 18 x 12 x 8¾ inches. The interior is lined with copper, and the exterior is of monel metal and encloses a layer of thermal insulation one inch in thickness on the bottom, sides, and top. This insulation is supplemented by a cover made from a woolen blanket which is fitted over the sides and the top.

The bath is heated by calrod units distributed in the water near the bottom. When these are operated at low heat, 440 watts, and controlled by a sensitive bi-metallic thermoregulator, the temperature of all parts of the bath at levels occupied by the sample containers is maintained within 0.2° or 0.3° C. without mechanical stirring. Under the usual operating conditions the heater is on about 25 per cent of the time.

The dimensions and construction of a sample-container are shown by the drawing in Figure 2. The container consists of a nickel-plated brass cylinder 4½ inches in diameter and 8⅜ inches in height with a cover which rests on a flange inside the cylinder about 2 inches from the top. The space above the cover is filled with thermal insulation made from discs of woolen blanket. Circulation of fresh air is secured by means of tubes, ¼ inch in inside diameter, mounted in the cover; one of these extends to within about ½ inch of the bottom of the container, and the other rises 6 inches above the cover. The exposed portion of the latter tube is insulated by a cylinder made from cork stoppers about 1 inch in diameter.

A rough measure of the rate of air circulation was obtained by placing naphthalene in the bottom of the container and observing the rate of evaporation. The naphthalene evaporated at a rate which indicated an air flow of 2 to 3 liters per hour. Since the volume of the container is about 1650 cc, this corresponds to an air change of about once or twice an hour. This rate of air circulation does not seriously affect the uniformity of temperature within the containers.

The temperature of the air in the containers was observed to be about 0.5° C. below that of the bath, consequently in order to maintain an air temperature of 70.0° C. the bath is operated at 70.5° C. The temperature difference between the bath and the air in the containers is due principally to the introduction of cold air, and to heat loss through the covers of the containers.

Thermometers mounted in different positions within a container indicated that the air temperature was constant to within 0.2° C. except close to the walls and within about ½ inch of the cover. The cover was about 1.5° C. below bath temperature, while the walls of the container were at bath temperature. Thermocouples placed in test pieces hung within the container in the usual way indicated that the temperature within the test pieces was constant to 0.2° C.

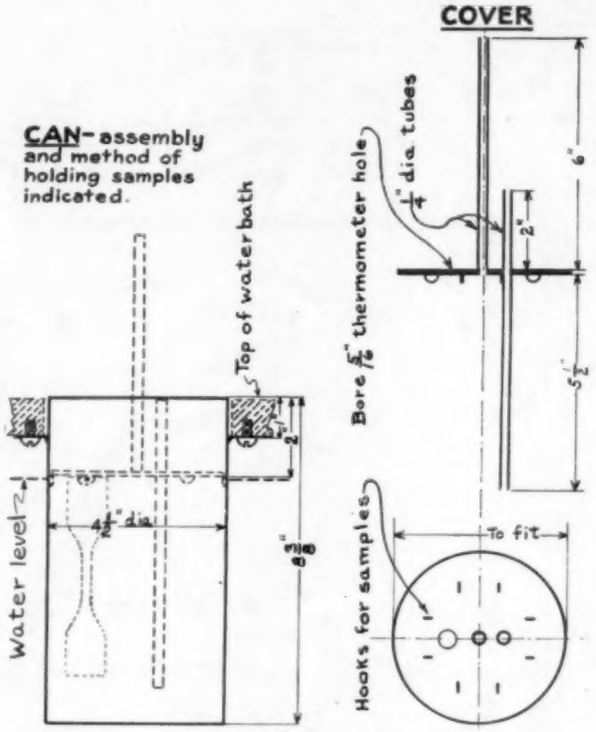


FIG. 2. Construction of individual containers. The material used is nickel-plated brass. Method of holding samples is also indicated.

Tests on Dental Rubber

WRITING in the November issue of the *Journal of the American Dental Association*, Commander Ronald Barber of the United States Naval Service, discusses the exacting and difficult procedures in dental practice in the making of satisfactory artificial dentures. Recent tests conducted by Commander Barber, and his associates, at Washington, D. C., have revealed some interesting data on this subject. In the search for a suitable material it must be remembered that it must not be injurious to the tissues of the mouth; it must be strong, durable and reasonably light in weight; it must have no offensive odor; it should have a dense, hard surface; and reasonable cost must apply. Rubber, of course, answers to most of these essentials.

Because hard rubber or vulcanite, which has been used extensively for years in making artificial dentures, does not possess all of the essentials required, there has appeared on the market in late years several materials intended as substitutes for vulcanite. Tests were conducted on two of these so-termed substitutes in comparison with a typical maroon rubber and an olive base rubber. The author describes the various tests made in this comparison but does not endeavor to suggest a specification table for either vulcanite or substitutes stating that "one may rate substitutes for vulcanite against the data given for vulcanite and predict with a fair accuracy the type of service to be expected from the qualities obtained in this research."

In summing up Commander Barber states that the values for proportional limit, ultimate tensile strength, modulus of elasticity and possibly surface hardness (all of which the specific tests revealed) showed no marked differences in the materials tested. The impact tests showed definite differences and indicated that a material having lower numerical values may be expected to display brittleness. The expansivity values indicated no definite superiority of one material over another of the four tested.

In conclusion the author urges extending the research to cover the entire field of properties and a specification prepared as soon as possible.

Hazards of Rubber Cement Churn and Storage Rooms

By E. W. Beck

Supervisor of Safety, United States Rubber Co.

WHEN we think of rubber cement churn and storage rooms we are reminded of the hazards involved in the operations. I have heard men in the petroleum industry talk on the handling and storage of inflammable liquids and state that the fire hazard in the storage of their products was no longer a real problem. I have also heard marine men state, prior to the terrible disaster of the Morro Castle, that it was impossible to imagine today a large modern ocean liner having a fire that would totally destroy it, and yet only a few months ago that which was apparently one of the finest ocean steamers afloat was totally destroyed by fire with the loss of more than 130 lives.

I believe I am safe in saying that the rubber industry and the safety engineers in the rubber industry have never taken the attitude that just because they have had so few fires and accidents in the cement churn room and cement storage room, that these rooms are no longer a problem to the industry. A fire and safety survey of any rubber plant is never complete until the rubber cement churn room and cement storage rooms have received a most thorough inspection.

We can assume to a great extent that practically all of the cement storage room hazards are present in the cement churn room. Bearing in mind that I am giving reminders and not recipes, I will review some of the important factors.

It is not possible to cover here every conceivable hazard in a cement churn room. If I were to do so I would have to commence by discussing the importance of reinforced concrete for floors, the protection of steel framework, the hazards of dead air spaces under cement room floors, explosion type windows, quick release ceiling openings, etc. Assuming that we have a well designed cement churn room I will confine my reminders to what goes on within the room.

Personnel

A designated person with a proper knowledge of all the hazards involved should be in charge of each shift and be held responsible for the safe practices of all employees working under his supervision, as well as the proper inspection and maintenance of all equipment within the department. He should not be allowed to leave his quarters for any great length of time. Definite instructions regarding safe practices should be posted within the room.

Each employee within the room should know all of the hazards and just what to do in the event of an emergency. They should be posted as to where the proper shutoff valves are and where the steam valves are located for flooding the room with steam. It should be a rule that employees in this department shall not carry matches in their working clothes. Lockers should be of the fireproof type and placed outside of the cement churn and cement storage rooms. No person should be permitted to take any material from the cement room without permission from the person in charge. Fooling or careless use of gasoline or cement at any time should not be tolerated; such action should subject the employee to dismissal. The use of gasoline, naphtha or benzene to clean clothing such as overalls, aprons, gloves, etc., should not be allowed.

Inspections and Reports

Chains, pulleys, belts and churns operating in these rooms should be grounded and it should be the duty of the Electrical Department to test periodically—at least once a month—the grounds on all shafting and churns, submitting written reports which shall be filed in the offices of the Safety Supervisor.

See that a complete independent grounding system is used of heavy gauge, bare, copper wire bonding together all churns, tanks, mixers, supply and discharge lines—ground contacts should be made in at least three points.

It should be the duty of the electrician to inspect monthly all lighting and wiring equipment. Only properly installed vapor-proof lights and switches with ample capacity should be used. Switches and fuses should be located outside the building or room and solvents should be handled through permanently installed pipe lines.

Gasoline tank installation and all auxiliary appliances must conform with regulations of the Associated Factory Mutual Fire Insurance Company, local fire department regulations, and municipal and state codes. The cement house should be inspected daily by foremen and a rigid monthly inspection should be set up by the Safety Supervisor and Superintendent. Rigid machinery inspections should be made by the Mechanical Department and frequent inspections should be made of the exhaust system in this room to see that it functions properly.

It is advisable, periodically, to invite the local fire department to make an inspection of the plant, more particularly the cement churn room. While you never expect to have a fire or explosion it is always good to be able to report that the city fire department has recently inspected the hazards at your plant. Every fire and accident within the department should be reported to the supervisor of safety without delay so that the proper investigation can be made and measures taken to prevent a recurrence. Records of all tests and inspections, including hygrometer readings, must be filed for periodic inspection.

Procedure—Mechanical Installations & Equipment

Cement churns should be kept covered at all times except when being filled. All other vessels in the room should have covers and be kept covered in order to reduce the amount of evaporation. Churn lids should be equipped with fusible links. A reliable recording hygrometer should be installed in the churn room to indicate the relative humidity of the air and read at least hourly. The relative humidity should be maintained above 40°.

Explosion-proof windows, doors and ceiling openings, where necessary, are to be properly maintained and kept in operation in the event of an emergency. These windows should be scraped and painted annually. A gravity supply

This paper was presented at the Annual Meeting of the Rubber Section, National Safety Council, on October 3, 1934, at Cleveland, Ohio.

of naphtha or gasoline should not be permitted. Pumps should always be used. Switch and pump locations must be outside of cement room. The control valve on gasoline supply line should be of the self-closing type.

One of the first requirements for efficient ventilation is the provision of adequate air inlets. Very often ventilation suffers in extremely cold weather because employees close all doors and windows which, in a tight room or building, brings about a very hazardous reduction in the exhaust ventilation. In regard to room ventilation, it is advisable that the inlet and exhaust be at opposite ends or corners of the room so that the air movement will effectively traverse the area. In addition, the exhaust should be taken principally at locations close to points where vapors may be expected so that the removal of inflammable vapors may be as effective as possible and so that employees in the room will be working in an atmosphere practically free from naphtha vapors.

When filling gasoline cans at the gasoline pump, the cans should be grounded to the pump prior to filling. This can be done by hanging a chain from the pump touching the can or placing same on a grounded plate. It is recommended that a securely fixed pipe line be run from the gasoline pump to the churn, doing away with the filling and handling of large open cans of gasoline and bringing about a closed piping system.

It is a good plan to adopt definite approved standard pipe colors, so that what each pipe line contains can be known from its color. Such a color scheme should follow the suggested national code. Humidification should be employed to help prevent and dispel static charges. Exhaust motors should be kept running at all times and under no circumstances should electric welding, cutting or burning take place in any cement churn room or cement storage room or in the vicinity of areas where cement and gasoline are being used. Ground wire brushes should be used on belts to remove charges of static electricity.

Provide a trap floor drain at least 4 inches in diameter in each room so arranged as not to be easily obstructed by floating material. A raised hemispherical piece of metal with at least half inch slits and holes is suggested. These drains should discharge to a dry well or some safe point in the yard.

Fire Protection

Under no circumstances should electric trucks or motor equipment of any kind be permitted to enter or operate within the room. Cans should not be dropped from trucks or racks to the floor, nor should they be dragged across the floor. All transportation trucks and racks should be grounded. Fire protection might be classified in three divisions:

1. Portable first aid equipment.
2. A special fixed system such as foam, carbon dioxide, etc.
3. General protection which can be counted on for the last line of defense; namely, automatic sprinklers.

Regarding portable protection, foam or carbon dioxide can be used for such hazards as rubber cement and for naphtha where the exposed liquid area is rather small. For larger areas foam has a decided advantage over carbon dioxide. For *fixed special systems,* foam or carbon dioxide is good. I believe the extinguishing effect of foam is more lasting. Carbon dioxide has proved its use when properly installed in the right quantities, and there is an advantage in the negligible damage by the extinguishing agent itself which tends to offset in a large measure the more lasting characteristics of foam. Where the systems are backed up with automatic sprinklers it is believed that one is probably as good as the other, but without automatic sprinklers many people favor foam extinguishers in this connection.

At one of our plants where we have an excellent fire record, carbon tetrachloride is delivered direct to the churn in the form of a spray through automatic sprinklers. Carbon tetrachloride when delivered direct to the churn is very effective. Some of our cement churn rooms are equipped with a complete automatic CO_2 gas system.

Avoid excavations below floor level that would tend to trap gasses. Actual experience has demonstrated that steam hose has rendered good service in extinguishing local fires, particularly fires in a relatively closed space, such as in the churns themselves.

Some advise inert atmosphere in cement mixers at all times. The exclusion of the oxygen will eliminate all fire and explosion possibilities. As you know, gasoline of itself does not explode. The vapors of gasoline when mixed with the right percentage of air are highly explosive.

Handling

Only approved safety cans should be used when transporting inflammable liquids to other parts of the plant. Gasoline and cement used throughout the plant should be used with care and so far as possible approved safe receptacles should be provided and used.

The flow of gasoline through a metallic line can produce a certain amount of static charge. It is for this reason that gasoline hose nozzles are of non-ferrous metal and when used should make a perfect ground contact before commencing the flow of gasoline.

The housekeeping in this department should be of the best—a place for everything and everything in its place. The floor should be kept clean of all cement, gasoline and other solvents handled in the department. In the event a spillage occurs, it should be cleaned up immediately. Nothing should be kept or stored within the department except the material necessary to carry on the operation of the department. No wooden cabinets or catch-all storage space should exist within the room. All materials and compounds used should be stored in metal bins, drums or metal barrels. The use of wooden barrels is not allowed.

Tools

All tools used within the cement churn room and cement storage room should be of non-ferrous metal in order to eliminate the sparking hazards. All other tools should be removed from these two rooms.

Shoes with non-ferrous metal nails should be worn. No shoes should be permitted with hob nails or metal heel plates as they may cause a spark where the fumes are the heaviest.

Only hard wood paddles and hard wood sticks should be used for stirring the cement. If metal is necessary, then non-ferrous stirring and scraping sticks should be used.

Do not permit the use of portable extension lamps or fixtures of any kind in rooms where inflammable liquids are handled. Regardless of initial precautions in the way of vapor-proof globes and mechanical guards, even the best of portable cords will deteriorate in use so that if inspection and maintenance is not of the very best a short conductor can be expected sooner or later.

Conclusion

There are many other hazards that space does not permit me to mention. However, I will mention one more and that is the human hazard. To me so much depends upon the human element, especially in this particular department and, as you know, the human element is very difficult to control in any plant.

You may comply with all the recommendations that I have made and yet if you have a careless worker in this department—one who some day may take a chance—you are likely to have something very serious happen. Therefore, make sure that the personnel in the cement churn room and cement storage room is not only properly instructed and aware of all the hazards, but is forever watching out for the safety of himself and his associates.

Aluminum Molds for Molded Goods

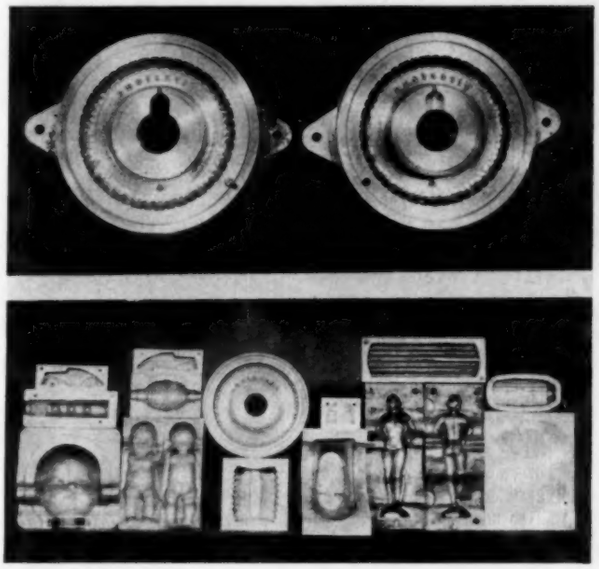
Description of Steps in Production of Molds for Toys and Other Molded Rubber Articles

IT is the problem of rubber doll manufacturers, as well as makers of other rubber products in the amusement category, to keep abreast of public interest and often to anticipate a consumer demand brought about by publicized characters. For instance, ten years ago the Kewpie Doll was the model on the crest of the wave. Today the public has been educated via newspaper advertising, motion pictures and publicity galore to accept dolls reminiscent of Walt Disney's Mickey Mouse, the Three Little Pigs, the Big Bad Wolf, etc.

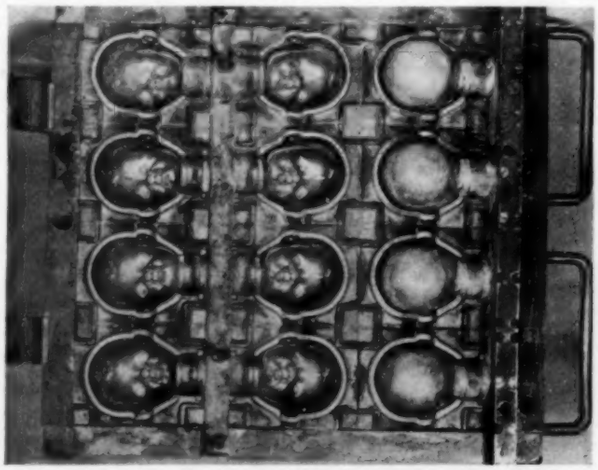
In like wise, the solution of this ever-present problem is in the hands of the mold makers since it is their creative ability, in conjunction with the actual manufacturers of rubber products, that makes possible the finished product. It is imperative, therefore, that such concerns as Ferriot Brothers, Inc., of Akron, mold makers for many years, keep an accurate check on the public fancy especially as it pertains to the Christmas Holidays, among others.

Practically all molds created by this organization are used in the manufacture of rubber toys and dolls. The family name of Ferriot has been identified with rubber products ever since Frederick Herrington, maternal grandfather of the brothers who now control the present company, settled in Akron about the time Dr. Benjamin Franklin Goodrich started his world-famous factory in the Rubber City.

Herrington was a steel engraver to the court of Queen Victoria of England. He was a member of the Royal Academy, and was one of the first artists engaged in rubber mold design. So the Ferriots come by their skill naturally, and skill is a requisite in the production of molds intended for rubber doll manufacture.



Top: A miniature tire mold of aluminum. Bottom: A variety of molds for rubber toys, dolls, soles and other molded goods.



Aluminum cavities, mounted on steel plates in series, ready to receive hot rubber for the molding of rubber dolls.

Quite a bit of care and preparation, to say nothing of 600 hours of hard work, go into the manufacture of rubber doll molds. In the Ferriot plant the design is first conceived by Joseph Victor Ferriot, youngest of the brothers, who, besides being a sculptor with membership in the Akron Society of Artists, is also a painter and etcher. His model is made in plaster and is then taken from his department to that of G. H. Ferriot where the machine work is accomplished.

The original plaster model is used as a positive from which a negative impression in plaster is made. These negative impressions are often made in sections determined by fine parting lines in order to take care of intricate designs which are hard to make in one piece.

The plaster mold, or negative, is then dried and the sections separated. Each negative is then lined with clay to the thickness of the rubber needed to produce the doll. Then the various pieces are put together and a core is made to fit into the cavity left by the removal of the original model.

Steel dies are then made from the plaster mold and these dies are used in forging the final aluminum molds in which the rubber is placed to make the dolls.

After the aluminum molds are forged from the steel

dies, they are machined on the outside surfaces and then mounted in series in plates which are designed to carry the cores. These cores are also made of aluminum, forming the inside of the toy, and are so made that they will give the final rubber the proper thickness. Proper thickness is quite important, both from the standpoint of the appearance and feel of the toy and that of the manufacturer. If the thickness is not properly predetermined, many thousands of pounds of rubber may be wasted in production.

The steps in the manufacture of hard rubber, soft rubber, sponge rubber and hollow rubber toys and novelties are well known to the readers of this publication, but few probably know of the real extent of this branch of the industry.

Jean Ferriot, six, daughter of E. F. Ferriot, mold maker of Akron, amusing herself with rubber dolls made from aluminum molds.

Several of the larger rubber doll manufacturers make more than a million dolls a year. Among these are the Miller Rubber Company and the Sun Rubber Company, both of Akron, and the Ideal Novelty and Toy Company, of New York City. The Seiberling Latex Products Company, Barberton, Ohio, produced more than a million of the Walt Disney characters—made famous by the magic of the motion picture—alone, to say nothing of thousands of other types of dolls.

An increasingly popular toy is the rubber automobile, modelled after the new Chrysler and De Soto airflow cars, which is being produced by the Perfect Rubber Company, Mansfield, Ohio. Almost a million of these were made in 1934. During the coming year new models of toys are being planned, for the doll industry has its style changes just like any other industry.

Ferriot Brothers, Inc., have found the use of aluminum molds for their products preferable to those made of materials traditionally used. In some cases molds have been used for three years or more for 24 hours per day, and have thus far shown little wear. Aluminum molds can be produced faster than other types of molds, and this is considered an advantage by rubber manufacturers who often are asked to prepare new molds for tires by automobile manufacturers within two or three weeks.

Ordinarily it takes more than twice as long to produce types of molds other than those cast of aluminum. President Ferriot, of the concern bearing that family name, also states that the articles manufactured with aluminum molds have a better finish and require much less lubrication to keep the rubber from sticking.

New Cut Rubber Webbing

A NEW cut rubber webbing, which has been termed Stretch-Tex, is now being marketed by the American Mills Company of New Haven, Conn. According to the company it is intended for use in men's, women's and children's wear. The rubber thread in this webbing is said to be especially treated in manufacture by a process which makes it resistant to commercial cleaning fluids and therefore products made with it may be dry cleaned without injury to the garment. Present plans call for a wide range of applications including sports jackets, shirts and other wearing apparel subjected to frequent cleaning.

Tests on Stretch-Tex were conducted by the Pittsburgh Testing Laboratory in connection with the effect on the webbing of perspiration, salt water and aging, as well as dry cleaning. According to the laboratory's report "whereas artificial aging tests for rubber are usually conducted in ovens at 170° C. for 96 hours, tests on Stretch-Tex elastic continued for a period of 16 days with practically no effect on the resiliency of the rubber." Specimens of the webbing were subjected to 25 commercial dry cleanings and are said to have stood the test admirably.

The American Mills Company is now developing a wide range of new constructions in the new product for manufacturers whose demands vary from fine silk ribbon elastic for pantie tops to heavy cotton elastic webbing for use in wind breakers and work blouses.

Rubber and Cork Mixture

INTRODUCTION in Germany of a new material termed "Krutex" is reported by the Bureau of Foreign and Domestic Commerce (Special Circular No. 3542). It is a mixture of rubber and cork. The new material is said to possess the advantages of both materials. Although the proportion of rubber, which is used as a binding medium, is quite high, panels of this material will not bulge out sideways when used as sub-layers or insulation. The specific weight is somewhat smaller than in the case of rubber. "Krutex" is produced in boards of from 0.8 to 12.7 millimeters in thickness. They may be put together to any desired thickness.

Rubber Manufacturing in Netherland

A SUBSTANTIAL GAIN was recorded by the rubber manufacturing industry in Netherland in 1933 over 1932. Last year the industry was composed of 12 companies employing 2,164 persons and manufacturing products valued at 5,545,000 guilders. This compares with 10 companies in 1932 which employed 1,828 persons and produced goods valued at 4,789,000 guilders. Bicycle tires and inner tubes are the most important products. Small increases, with the exception of the year 1932, have been recorded in the manufacture of these two items, during the years of 1929-1933. In 1929, 2,345,000 pneumatic casings were produced, while 2,943,000 were manufactured in 1933.

Duphax—a Brown Factice

AFTER an exhaustive study of the behavior of many grades of Factice in Duprene compounding, Factice being the most important pigment-bearing diluent for the DuPont product, the Stamford Rubber Supply Company, of Stamford, Connecticut, has developed Duphax, described as a special type of Brown Factice for use with Duprene. This material is said to have been developed after its special fitness had been proven in the Stamford company's laboratories as well as by Du Pont technicians.

A panoramic view of the rubber exhibit at Franklin Institute, Philadelphia.

RUBBER EXHIBIT

Exhibit at Franklin Institute in Philadelphia Shows Products Used in Making and Testing Tires

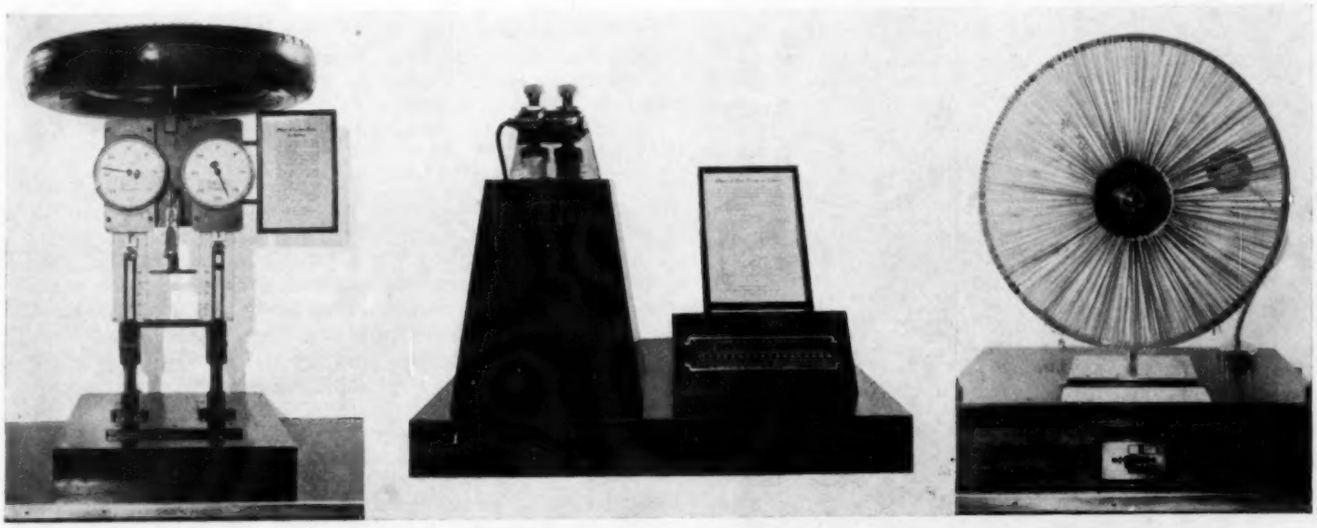
By N. H. Smith

AN exhibit showing the relationship of chemistry to the rubber industry has recently been added to the Chemistry Section of The Franklin Institute in Philadelphia, Pa. This exhibit was made possible through the generosity of The Lee Tire and Rubber Company of Conshohocken, Pa.

A series of photographs shows a modern plantation in Malaya, the method of tapping the rubber tree to start the flow of latex, a close-up of the cut showing the flow of latex and the collection in small pails, the coagulating station where the rubber is coagulated and the bales of crude rubber ready for shipment to the various markets of the world. A map shows the important rubber producing areas of the world. This is followed by a series of photographs showing the important operations in the manufacture of the automobile tire.

The exhibits in the museum are the push-button type; that is, the visitor can start the exhibit in motion. A group of these push-button demonstrations shows the fundamental principles on which the rubber industry is founded.

The first demonstration shows how rubber is obtained from the latex. When the button is pressed a portion of latex is dispensed into a rotating glass container. Following this acetic acid is added and the rubber coagulates in the form of a doughnut. This glass container is inverted. The rubber falls out and the dish is then washed free of acid. The latex for this demonstration is supplied by the Heveatex Corporation of Melrose, Massachusetts.



Left: **A demonstration machine displayed by Lee Tire which proves the effect of carbon black on rubber by showing elongation pull.** ***Center:*** **Test machine which dynamically proves the effectiveness of zinc oxide on rubber put on exhibit by N. J. Zinc Company.** ***Right:*** **A rotary heat engine composed of rubber bands stretched from the hub to the rim of a wheel, developed by W. B. Weigand of Binney & Smith Company.**

Several chemicals can be added to rubber to improve its properties and make it a product of great usefulness. Carbon black has been found to increase the strength and resistance to wear. The next demonstration shows the effect of carbon black on rubber. When the button is pressed a black rubber ring containing 43 parts by weight of carbon black to 100 parts of rubber and a ring containing no carbon are stretched 100 per cent of their length. The two dials register the pull in pounds necessary to produce this elongation. The practical effect of this stiffening or reinforcing may be seen on the tire mounted above the exhibit, which has a tread made of the two compounds used in the rings. The tire was placed on a car and run for several thousand miles. The difference in wear is apparent and accounts for the fact that all present-day tire treads contain carbon black.

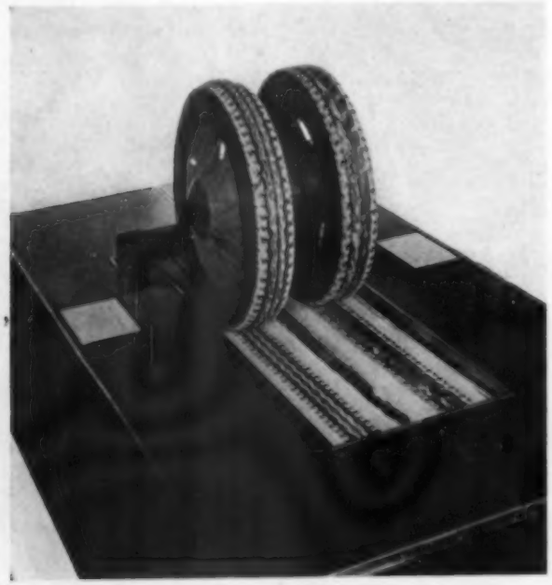
Practically all rubber articles are subjected to considerable distortion during use and most uses of rubber depend upon its ability to withstand, without excessive failure, elongations and compressions impossible with any other material. Since tires and other articles of rubber wear away much more rapidly at high than at moderate temperature, it is important to keep this as low as possible.

The addition of zinc oxide to a rubber stock produces a compound which has a better heat conductivity and at the same time develops less heat when worked. The next demonstration, which was developed by the Research Division of the New Jersey Zinc Company, shows dynamically the effect of zinc oxide on rubber.

When the button is pressed two rubber blocks, one containing zinc oxide and the other carbon black, are compressed 350 times a minute. Thermocouples inserted in these blocks measure the heat developed due to compression. The observer sees the rate at which heat is developed in these two rubber stocks.

The Xylos Rubber Company, of Akron, Ohio, show their process of reclaiming rubber from worn automobile tires. A pictorial flow model describes the various steps and samples of products show the condition of the rubber at each step in the process.

Many people wonder why a tread is placed on an automobile tire. The Safety Tire Tread demonstration illustrates the purpose of this tread. When a rubber tread of a tire is run against a dry surface, the coefficient of friction or the grip between the tire and the road is high and there is little tendency for the tire to slip or skid. Moisture, however, is a very effective lubricant for rubber and, therefore, when the pavement has a coating of moisture or mud, there is a pronounced tendency for the tire to slide.



A test devised to illustrate the advantages of non-skid tread patterns over smooth tread tires on wet surfaces.

Another Lee Tire exhibit portraying all of the raw materials which go into the manufacture of the completed tire.

This demonstration shows how the tire with a smooth tread runs over a wet surface with a film of slush or mud lubricating the tread and permitting it to slip or slide readily. On the other hand, the tire with the non-skid tread pattern effectively cleans the pavement by a "squeegee" action, squeezing the moisture and mud into the spaces between the design and providing a more intimate contact of the tire with the road surface, greatly reducing the lubricating effect of the water and thereby increasing very considerably the hold or grip of the tire on the road.

Most materials expand when heated. Rubber is an exception to this rule, as is shown in the Wiegand Rotary Heat Engine. A number of rubber bands are stretched from the hub to the rim of a wheel; when heat is applied to a portion of the stretched bands, they contract and exert a pull from the eccentric hub to the rim, starting the wheel in motion. This brings another set of bands into the heated area and the rotary motion is thus continued as long as the heat is applied. This wheel was developed by W. B. Wiegand, Technical Director of Binney and Smith Co., New York.

The story of rubber is completed with an exhibit showing all the raw materials which go into the manufacture of an automobile tire. Another exhibit shows the effects of sulphur, accelerators and antioxidants on rubber.

The following companies also contributed to the rubber exhibit: R. T. Vanderbilt, New York, and The Naugatuck Chemical Company, Naugatuck, Connecticut, on antioxidants; E. I. du Pont de Nemours and Company, Wilmington, Delaware, on the synthetic rubber, DuPrene; and the Atlantic Precision Instrument Company, Malden, Massachusetts, showing the method of controlling the weight or thickness of sheet rubber by means of the Verigraph.

This interesting exhibit of rubber in the Hall of Chemistry of The Franklin Institute is open every afternoon and Sunday. The several sponsors of the semi-technical exhibits, as well as the officers of the Institute, hope that the public will learn something about the rubber industry by reason of this public exhibition.

Halogenated Rubber Products

By Frederick Marchionna

Author of "Latex & Its Industrial Applications"

THE FOLLOWING abstracts of United States Patents continue the abstracts on halogenated rubber compiled by Mr. Marchionna in the course of an investigation of patents on rubber derivatives. They are being brought to your attention because of the renewed interest in chlorinated rubber within the past few years. This material will later be incorporated, according to present plans, into a book that will supplement the author's bibliography "Latex and Its Industrial Applications." The first 18 abstracts appeared in the November, 1934, issue of THE RUBBER AGE—EDITOR.

19.—Bedford & Kelly; U. S. Pat. 1,377,152, May 3, 1921; *Halogenated Rubber Products.*

Rubber, whose so-called free bonds are first satisfied with sulfur, is treated with a halogen so that the resulting product will contain a halogen and sulfur. Crude or vulcanized rubber may be used. In one example pale crepe rubber is dissolved in carbon tetrachloride and 2% sulfur added and then chlorine gas passed through the solution until no more gas is absorbed. The resulting halogenated rubber in solution containing sulfur may be used as such or the solvent evaporated to obtain a solid product. In another example vulcanized rubber scrap is first extracted with acetone, boiled with sodium hydroxide, dried, suspended in carbon tetrachloride and halogenated with chlorine. Or the rubber scrap purified as above is slowly combined with twice its own weight of pine oil, aniline, nitrobenzol, etc., and the mixture heated from 150°C. to 170°C. to obtain a homogenous solution. This solution is diluted with benzol, the rubber precipitated with a coagulant, redissolved in carbon tetrachloride and chlorinated to saturation. Or vulcanized rubber scraps may be heated in an autoclave with a solvent to obtain a solution, and then halogenated.

20.—Hopkinson; U. S. Pat. 1,442,218, Jan. 16, 1923; *Halogenated Rubber Bale.*

An inexpensive, better bale suitable for latex or rubber shipment is made by treating the bale, after it is compressed, but before it is shipped, with a weak solution of bromine in carbon tetrachloride. The treatment may be carried on by brushing, dipping, etc., in a 3% solution of the chemicals for a fraction of a minute, followed by heat evaporation of the solvent. A "case-hardened" bale of hardened and toughened surface is obtained, which is very resistant to oxidation, acids, alkali and oils. Chlorine, iodine, and sulphur monochloride weak solutions may also be used instead of bromine. The bale can be made from coagulated latex or by direct drying of the latex; the bale so made and subsequently treated with bromine merely gives to the rubber an "halogenated skin."

21.—Hopkinson; U. S. Pat. 1,491,265, April 22, 1924; *Halogenated Latex Rubber.*

Halogenation of latex is carried out as follows: kieselguhr, or other clay materials (100) is wetted with water (150) to which has been added concentrated ammonia (9) in order to neutralize and prevent coagulation of rubber latex due to the chlorine used and the hydrochloric acid formed; to this filler mixture is added latex (100 of 36% rubber) and the whole homogenized by agitation; excess water is removed, the material is screened and dried at about 200° F., and is then placed in a suitable container to be subjected to chlorination. The halogenation is carried on by passing chlorine gas through the dry mass until no more chlorine is absorbed. The vessel is opened, aerated, and concentrated ammonia is stirred in the powder to neutralize any acid formed. The material is washed free of chlorine and chloride, dried and molded. Other rubber compounding ingredients—pigments, scrap rubber, carbon black, etc. —may be incorporated in the dry chlorinated product before molding. The material is characterized by the rapidity with which it can be molded. It is suitable for electrical and other various uses.

22.—Edison; U. S. Pat. 1,495,580, May 27, 1924; *Chlorinated Rubber.*

Thin sheets or strips of rubber are placed in an air-tight glass vessel and dry chlorine gas is introduced therein in the presence of the vapors of carbon tetrachloride, the solvent vapors being passed continuously by means of a cyclic circulatory system, whereby as the vapors issue out from the chlorinating vessel they are condensed, freed of any chlorine, hydrogen chloride, etc., vaporized, and returned again in the reaction vessel. Under the action of the chlorine and the solvent vapors the rubber softens and swells and the chlorine combines with rubber to obtain a highly chlorinated rubber in the form of a syrupy mass which is precipitated by dumping the hot mass in hot water, or by agitating it violently with steam whereby the chlorinated rubber is emulsified. The chlorinated rubber is then recovered by centrifugation or by screening, and washed to remove any gases. The product may be admixed with naphthalene and molded.

23.—Bradley & Mcgavak; U. S. Pat. 1,519,659, Dec. 16, 1924; *Rubber Hydrohalide Films.*

A transparent, stable photographic film of low inflammability is obtained by halogenating rubber with hydrogen chloride gas to completely saturate the rubber molecule, and forming a film from the hydrohalide product. Rubber (5 Kgs.) is dissolved in chloroform (95 Kgs.) and the solution treated with perfectly dry chlorine gas until a test shows a chlorine content of 30 to 35%. As the resulting rubber hydrohalide solution is of a reddish-brown color, it is treated with chlorine gas until 1 to 2% of the gas has been absorbed when the solution is perfectly clear. Dried air is then passed through the clarified solution to remove any free hydrogen chloride or chlorine, and it is then filtered. To each 100 Kgs. of filtered solution there are added 40 to 60 Kgs. of acetylene tetrachloride containing 1 to 5% of pine oil, dipentine, limonene, etc., acting as anti-acid substances to stabilize the rubber hydrohalide film. The resulting solution is then spread into a thin film on a plate glass, the solvent evaporated, and the dried film coated with a sensitized gelatine film, and wound on spools employed for rolling photographic films. The hydrobromide and hydroiodide of rubber can be similarly prepared.

24.—Thieme; U. S. Pat. 1,527,715, Feb. 24, 1925; *Insect-Catching Glue.*

Halogenated rubber obtained in any known way is mixed with a quantity of chlorinated oil to obtain a chlorinated mixture which has the property of being permanently tacky, and can, consequently, be used as a substitute for the ordinary insect-catch-

ing glues. Thus, rubber (2) is dissolved in carbon tetrachloride (40) and the solution is saturated with chlorine. Cotton seed oil (100) is heated to 70°C. and chlorinated until it has absorbed 30% of its weight of chlorine. The two chlorinated products are then mixed in any desirable proportions, the solvent evaporated, and the tacky material used as insect-catching glue.

25.—Dennison; U. S. Pat. 1,532,234, April 7, 1925; *Halogenated Rubber Surfaces.*

A leather substitute having a hard, glossy finish is obtained by rubberizing a fabric base, and halogenating the rubber surface to produce a hard, smooth surface finish. A cloth is given a friction-coating of rubber, coated with a rubber composition containing powdered leather fibres, and calendered. The sheet is then given a coating with a soap solution, dried and cured. The sheet is then made to contact, on its soaped surface, with a halogenating solution consisting of bromine dissolved in carbon tetrachloride, and the solvent evaporated leaving a glossy, integral halogenated rubber surface. The process may be varied by brominating the rubber surface before vulcanizing, drying the sheet, subjecting it to further bromination, embossing the halogenated surface, and then curing the sheet. Instead of bromine, chlorine or iodine may be employed in the process. The leather-like products thus obtained can be manufactured into luggage, upholstery, leatherette coats, etc.

26.—Ellis; U. S. Pat. 1,541,693, June 9, 1925; *Varnish Reviver Material.*

A chlorinated rubber of 44 to 47% chlorine content, when dissolved in a suitable solvent and admixed with a homogenizing agent, such as camphor, triphenyl or tricresyl phosphate, etc., or a resin, such as a synthetic resin, congo resin, cumarone resin, etc., can be sprayed or brushed on old varnished surfaces to brighten and revive the varnish finish. In the example given equal quantities of chlorinated rubber and cumarone resin are dissolved in benzol, toluol, xylol, etc., to make a 2 to 5% solution, and the solution sprayed on varnished surfaces of old automobiles or similar vehicles to revive the varnish and give to it a glossy, hard, varnished surface.

27.—Ellis; U. S. Pat. 1,544,529, June 30, 1925; *Chlorinated Rubber Products.*

Rubber in the form of a solid sheet is chlorinated in the presence of a solvent in quantity insufficient to dissolve the rubber, but sufficient to reduce the rubber into a jelly, plastic mass which is easily chlorinated. In an example, crepe rubber is worked with an equal quantity of toluol between cold rolls until the solvent has been all absorbed by the rubber. The jellified mass is transferred in a closed internal mixer, and chlorine gas is passed through the mixer, with or without air, nitrogen, or other inert gases, until the rubber is fully saturated with chlorine, after which it is washed, any acid present is neutralized, and free chlorine removed. In another example, rubber strips are suspended in carbon tetrachloride, and chlorine gas bubbled through to react with the rubber, to form a chlorinated rubber which dissolves readily in the solvent. Fillers, such as wood flour, talc, barytes, litharge, silex, asbestos, wool, etc., may be incorporated in the product. Thus, a 10 to 15% solution of the chlorinated rubber is admixed with sufficient sawdust so as to make a dried molded product containing equal quantities of filler and binder. The chlorinated rubber solution may be used for treating textile fibres, leather, paper, etc. Natural or synthetic resin may be added, with or without fillers.

28.—Ellis; U. S. Pat. 1,544,530, June 30, 1925; *Chlorinated Rubber Products.*

A chlorinated rubber of 50 to 67% chlorine content or more is made by passing liquid chlorine into rubber in the presence of a regulated quantity of inert rubber solvent. Rubber (25) is placed in a glass cylinder containing carbon tetrachloride (1350). The mixture is agitated by means of a mechanical stirrer, and, before any rubber has been dissolved, chlorine gas is passed through the liquid. In about 1½ hours the rubber has been completely dissolved and warmed by the partial chlorination of the rubber molecule. While chlorination is being effected, the apparatus is exposed to sunlight or another source of actinic rays, to assist in the halogenation, and more crude rubber is introduced in the glass cylinder from time to time until about 80 more parts of rubber have been added, and chlorine is continued to pass in the reaction vessel until about 70% of chlorine has combined with the rubber. The resulting chlorinated rubber in solution is dried on a hot plate to remove the solvent at a temperature above that of a water bath to obtain a fluffy product resembling masses of cotton or snow which is readily dissolved in a solvent and the solution used for coating or impregnating articles.

29.—Ellis; U. S. Pat. 1,544,531, June 30, 1925; *Chlorinated Rubber Products.*

Rubber, in solid form, is treated with chlorine under a pressure between 100 to 270 lbs. to produce a highly chlorinated product containing 67% of chlorine or more. Preferably, the chlorine used should be in excess of that necessary to combine with the rubber, since the excess chlorine appears to act as a solvent for the chlorinated rubber product and produces a viscous mass or semi-liquid material. The chlorine may contain added bromine or iodine, the latter acting as catalyst in the reaction. Crepe rubber (211) is cut into small pieces and placed in a lead-lined iron vessel. Chlorine from a warmed cylinder is passed through cooled pipes and into the chlorinator which is kept cool during the ensuing reaction; usually a temperature of 70°C. in the chlorinator and a pressure of no less than 60 lbs./sq. inch gives a good product. The chlorine is passed into the rubber continuously for 30 to 35 hours, venting the apparatus every 6 to 7 hours to remove any formed hydrogen chloride. The completely chlorinated rubber is a coalesced mass of vesiculated structure containing between 67 to 70% of combined chlorine; it is hard, but softens at about 120°C., and decomposes at 170° to 180°C. It is resistant to organic and mineral acids, to alkalies, and other chemicals.

30.—Ellis; U. S. Pat. 1,544,532, June 30, 1925; *Chlorinated Rubber Products.*

A modification of U. S. Patent 1,544,530. Crepe rubber (125) is cut into small pieces and added in three portions into a vessel containing carbon tetrachloride (2000), and iodine (2) acting as catalyst for the chlorination reaction. Liquid or gaseous chlorine is then passed through the solution which is kept continually agitated, while the chlorinator, which is lead-lined, is kept at 45° to 55°C. When the rubber has combined with 50 to 67% chlorine the solution is evaporated at about 100°C. to obtain a light yellow, fluffy, tough product which will dissolve readily in benzol, ethyl acetate, etc. The solvent, however, may be steam distilled, or the chlorinated rubber recovered by precipitation with alcohol, acetic acid, gasoline, etc. When the chlorinated rubber is to be used in the form of a solution, then it is advisable to boil such a solution with lime, ammonia, or other alkali substances to neutralize any hydrogen chloride formed.

31.—Ellis; U. S. Pat. 1,544,533, June 30, 1925; *Halogenated Rubber Products.*

A halogenated rubber hydrohalide can be obtained by subjecting rubber to the combined action of a mixture of chlorine and hydrogen chloride at super-atmospheric pressure in a series of vessels. Rubber (100) in form of crepe or sponge rubber, or dry-sprayed latex, is introduced in a lead-lined iron chlorinator connected with a cylinder containing liquid chlorine which is kept at 40° to 50°C. during chlorination, while the chlorinating vessel is maintained at 10° to 15°C. Chlorine is passed into the rubber at a pressure of 260 to 290 lbs./sq. inch for about 8 hours. After this period chlorine is shut off and any uncombined chlorine and hydrogen chloride formed are discharged into a second chlorinator containing crude rubber. The first chlorinator is recharged with chlorine and both chlorinators kept at 60° to 65°C. for 16 hours. After this time the waste gases from both chlorinators are discharged into a third chlorinator containing fresh rubber. The rubber in the first chlorinator, which is fully chlorinated, is removed, and this chlorinator then recharged with crude rubber to become the third chlorinator of the series, and the cycle of operations continued. The products obtained contain chlorine of addition and substitution, as well as hydrogen chloride in the rubber molecule, thus obtaining a chlorinated rubber hydrochloride.

Rubber Printing Plate Improvements

EMPLOYMENT of rubber plates in the printing industry has materially increased in recent years, and recent improvements in production may make their use even more general. Measureable savings in cost over metal plates are found to be available through the new processes, while the results are in every way comparable to the best that can be obtained by old methods.

Two types of rubber plates have been used by certain branches of the printing industry. The vulcanized pressed plate—best known by its characteristic product, the rubber stamp—is widely employed in the corrugated-box and packing-paper industries. The cut plate, on the other hand, is now used rather extensively for wall paper, for silhouette effects on selected materials, for color tints, and for poster work. Introduced as a means of obtaining soft, distinctive effects with water-color inks, rubber plates of this latter type have been made oil-resistant and otherwise improved so that they may be used with regular inks.

In its application to work of the poster class, the rubber plate is giving the letterpress printer a means of competing with the lithographer. Flat color oil inks are used, and the ink is laid on various weights and grades of paper, including embossed cover stocks, solidly and evenly, without pulling. On the latter, particularly, the rubber appears to have peculiar advantages, since the normal finish is not crushed, even though the ink is deposited in the ofttimes deep crevices of the paper.

Over metal plates of the same size, the rubber has a substantial advantage in cost. Rubber plates cost only 35 to 50 per cent as much as metal plates of similar size, depending upon the amount of detail in the pictures. The saving in artwork is 50 per cent or more. Only rough outlines are required for the cutter to follow. These economies, however, do not apply where considerable detail is involved.

Speed and quick delivery are possible with cut rubber plates. By this process a poster may be on the press and running by the time an artist could have made the drawings for photoengraved plates.

One of the leaders in developing this process in the United States has been the Neely Printing Company, a prominent Chicago printing house. This organization a few months ago conducted an exhibition of examples of its craftsmanship in rubber-plate printing, and visitors from the advertising and printing trades were greatly impressed with the possibilities the process offers.

An entirely new production method that makes the direct rubber print possible for fine-screen halftones, delicate etchings and hairline type faces has, however, recently become available through the inventions of a retired German cylinder-press manufacturer and his son, a chemist. The new rubber plate, which is poured, not pressed or cut, is already being used in Germany, Denmark, Poland and Switzerland, while licensing arrangements are being negotiated for several other countries.

Manufacture of the poured-rubber plates is extremely simple—as easy as the casting of a lead stereotype—and requires neither technical skill nor new machinery. The process involves merely pouring and leveling the plate, drying out the residue moisture in a small electric oven, separating the rubber from the matrix, mounting the rubber on wood, and the printing of various materials with it. Runs of a million impressions are said to be possible without perceptible wear on these plates, and they reproduce the most delicate detail of finest screen halftone or type. The achieved results resemble offset, and the plates are adaptable to the entire book and commercial field.

Economies effected through this new process include the elimination of makeready and of roller wear and tear, displacement of electrotypes and stereotypes, reduction of ink consumption by 30 to 40 per cent, substitution of book for litho inks, reduction of power consumption by 60 to 70 per cent, and prolongation of life of press equipment.

Rubber Industry of Austria

THE rubber industry in Austria, reports the Bureau of Foreign and Domestic Commerce, consists mainly of one company, Semperit-Reithoffer, with three plants at Wimpassing, Vienna and Traiskerchen. The plants are now reported to be employing about 5,000 workers. The company also operates plants in Czechoslovakia, Yugoslavia, and Poland. It is reliably estimated that slightly more than 50% of Austrian rubber goods production is exported, chiefly to England. Production statistics are not available, but tire output for 1934 is estimated at 100,000 casings, 110,000 inner tubes and 3,000 solids, of which only about 3% is exported. Imported tires account for about 18% of domestic sales, a third of these imports coming from France, a third from England, a sixth from the United States, and a sixth from other countries.

The slump in tire imports which occurred in 1933 has been arrested, and British and American tires have increased slightly their share of the imports, while French tires lost slightly, and German tires drastically, during the first half of 1934. Imports from the United States included $26,000 worth of tires and $24,000 worth of other rubber goods.

Austrian imports of crude rubber, scrap rubber, and gutta percha increased 48% in quantity and 62% in unit value or price in the first half of 1934, compared with 1933. Imports of rubber products increased 2.7% in quantity and on the average show a price advance of 6.2%. Exports of rubber products from Austria increased 28% in quantity and show an average price advance of 7.3%, compared with the first half of 1933.

Austrian trade statistics show an export surplus on foreign trade in rubber and rubber products, exports being valued at 8,607,000 shillings, and total imports at 6,069,000 shillings in the first half of 1934. Exports of rubber goods are distributed through European countries; imports come chiefly from England, Germany, and France; and 90% of the rubber imports come directly from British and Dutch possessions in the Middle East.

Several mergers completed in 1933 have enabled this Austrian industry to hold its own in the domestic field as well as meet competition abroad. The industry claims it lacks sufficient tariff protection and at the same time protects continued endeavors of neighbors to shut off imports by customs barriers and currency restrictions. Exports to Western European countries are said to have been conducted at a loss, while those to overseas markets were greatly hampered by exchange restrictions. Although Austrian tariff rates have been unchanged since 1924, sales and crisis taxes and exchange restrictions have operated against imports, and there have been import restrictions on some articles, the net result being increased domestic production especially in rubberized fabrics, squeaking dolls, toy balloons, and rubber thread.

The Russian Rubber Situation

MUCH information has been published in this country during the past few years concerning the endeavors of Soviet Russia to cultivate its own natural rubber. Most of these notices were enthusiastic in reporting progress and development in that country along such lines. In an effort to secure an unbiased opinion of the true state of affairs the Leather-Rubber-Shoe Division of the Department of Commerce has had translated an article written by V. Makagon in the November-December, 1933, issue of *Sovietski Kauchuk* (Soviet Rubber). In its report accompanying this translation the Division advises that if the information supplied by the author is authentic Russia will apparently not be a factor of any consequence in world production of rubber during the next few years, at least, despite accounts which have appeared in the American press.

Mr. Makagon's article is concerned with the question as to why no appreciable advance has been made by the "*Kauchukonos*" (Rubber Trust) in the development of natural rubber in Russia. He points out that the production of rubber in the Soviet is based upon principles which differ from those used in other parts of the world. He states "rubber is produced (in other countries) from the milky juice of gigantic trees by tapping them, but preserving the plant itself, our rubber production is based on the processing (implying destruction) of shrub-like and herbaceous plants containing the ready (coagulated) rubber, while the process of production itself resembles on the whole the production of sugar, starch, etc."

Referring to the length of time it took to produce efficient rubber plantations in the tropics as of 24-year duration, the author defends the position of the Soviet in producing but 150 tons (approximately) in 1934, in the fifth year of Russia's rubber development. He points out that it was not until 1910, the 29th year of work for producing an appreciable amount of plantation rubber (8,200 tons) in the tropics, and therefore the estimated development of 10,000 tons for 1937, which will be the 8th year of Russian cultivation, will be an enviable record. This estimated production is based on cultivation of 200,000 hectares of rubber plants planned for 1937.

The three most important tasks which confronted the special committee on rubber, according to the author, were regional distribution of rubber-producing plants, search for new rubber-bearing plants and mobilization of seed resources. The first, states Mr. Makagon, has been satisfactorily accomplished with various regions found suitable, permitting extensive cultivation. The second has resulted in the discovery of two new rubber-bearing plants, the Kok-Sagyz and the Krym-Sagyz (see the August, 1934, issue of THE RUBBER AGE for details concerning the former plant, as well as the Tau-Sagyz). The Soviet is depending upon these two plants to solve its rubber problem in the next few years owing to rapid growth and early technical availability.

As regards the third task, seed resource mobilization, the difficulties are many including the fact that the climate in localities where the rubber-bearing plants are cultivated is unstable, that the individual plants are few and scattered over large areas and that, as a rule, these plants "have samariform seeds which limits the time of collection." Some progress on this last task was made during 1933.

Discussing the actual condition of rubber plantations in Russia, as an average, the author states that only one conclusion may be drawn, i.e., no complete successes have as yet been achieved. This failure is attributed to lack of knowledge regarding sowing time and too much guesswork on the part of the cultivators. Although strenuous effort was made by certain plantation operators to master agricultural technique in this respect on the whole those concerned failed to cope with their task of creating full-value plantations.

No appreciable development was noted in scientific research work during 1933 in Russian rubber production. Some positive results were accomplished in 1933 on the mechanization of agricultural processes. The development of gutta-percha is much farther advanced than rubber cultivation. The year 1933 was spent in preparing for future results which should be visualized in the 1934-1937 period ending in the production of 10,000 tons of rubber, or better, annually.

From the facts and figures quoted in the article the author sums up in the following conclusions: that despite the complexity and difficulty of natural rubber cultivation, and the failures experienced to date, enormous progress has been made; that although progress is slow, and should be expedited, the many diverse sections involved are developing; that possibly new failures are in store, but the fundamental ground-work has been laid with sufficient rubber-bearing plants growing on extensive areas in such numbers as to make it evident that the enterprise will eventually be profitable; and that much experience has been gathered regarding rubber-bearing plants despite the many unsolved problems with regard to complicated production.

As the Leather-Rubber-Shoe Division points out, it is evident from the facts and figures presented, if they are truly representative of conditions in late 1933, that the Soviet will not be a factor of any consequence in world production of rubber for many years to come.

Making Boots from Liquid Latex

THE Liverpool, England, factory of the Dunlop Rubber Company, Ltd., is now manufacturing boots from liquid latex which arrives at the factory in 500-gallon tanks. An interesting process is followed in this manufacture. After the essential chemicals, accelerators, etc., are added to the latex, the fabric core of the boot, on lasts, is dipped into it. The fabric lining, with its strengthening pieces for heel and toe, is made of canvas into which rubber has been impregnated by the usual roller method. Two dips are made into the latex with a bath in a fixing solution following each dip. Sole and heel pieces of solid rubber are then added to the embryo boots which again are dipped and taken to the curing room.

After the curing operation is completed the boots emerge in a homogeneous body. The top is cut into shape, the last is removed, and the boots are ready for packing and shipping. Dunlop technologists claim that boots made from the liquid latex are far more pliable than those made by usual methods. With the liquid latex it is possible to make close-fitting boots which are easily removable from the foot, the rubber stretching sufficiently to allow for comfortable handling.

Rubber Goods in South Africa

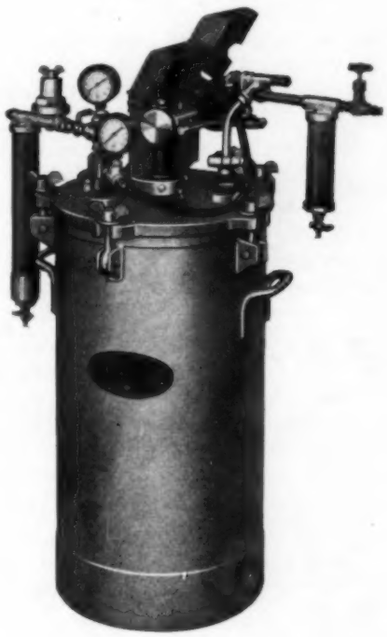
ALTHOUGH a number of experiments have been carried out seeking the growth of rubber in the Union of South Africa, particularly around Durban, it has so far been found impossible to grow it there. But the manufacturing of rubber goods in South Africa has developed from a praiseworthy experiment to the category of a big industry. With the exception of tires, the Union is producing practically all forms of rubber goods required for every-day existence.

Included among the rubber products produced by the South African Rubber Co., Ltd., at Howick, and other factories, are garden hose, cushions, erasers, doormats, ferrules, handles for cricket bats and racquets, tennis balls, tiles, bathmats, soles, heels, and dozens of other items.

New Equipment

Production Powder Spraying Unit

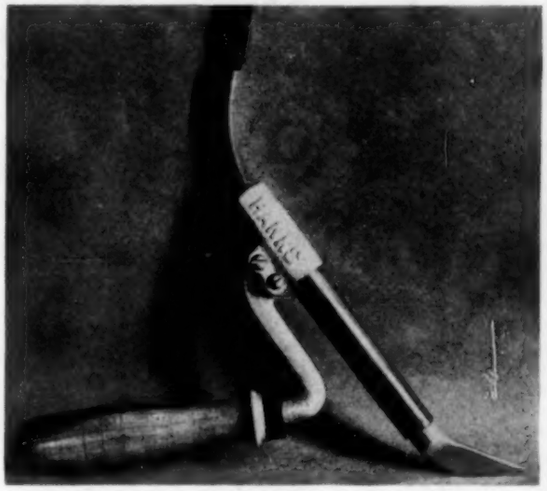
DEVELOPED for manufacturers of extruded seamless rubber tubing, a new production powder spraying unit, designated as Model LP-47-B, has been introduced by the Spray Engineering Company, Somerville, Mass. This unit provides a continuous uniform flow of lubricating powder from the delivery nozzle of mandrel of tubing machines. It can be installed without any changes in the tubing machine. Among the features claimed for the new spraying unit, are included: control head including reducing valve and gauges to control the air pressure in the container; adjustable delivery nozzle



with clamp to hold any desired setting; air motor-driven mechanical agitator with exhaust muffler; 12' lengths ¼" heavy duty air hose with renewable couplings; and 6' length ¼" powder delivery hose with renewable couplings. It is also furnished for dusting operations equipped with a pistol grip type of spray gun, delivering either a fan or a cone shaped spray.

New Rubber Cutting Knives

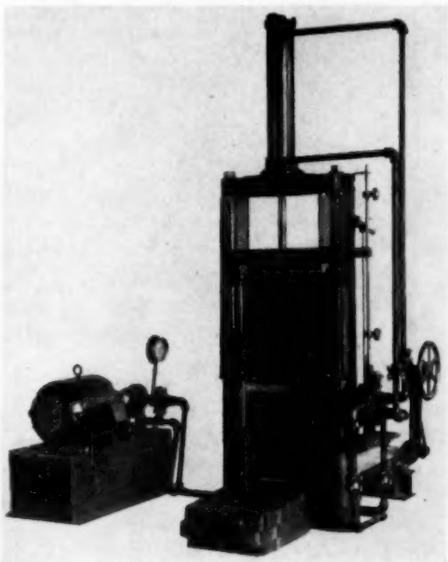
TWO new types of rubber cutting knives, known as "Offset" and "Straight" models, have been introduced by R. S. Hanks, manufacturer of electrical equipment, 145 Bedford Street, Lexington, Mass. The "Offset" type, illustrated herewith, is made in two sizes, 44 and 60-watt. The heated knives, electrically operated, are used for cutting sheet rubber. After the blade is heated, the knife cuts clean with very little pressure; a sharp edge is not necessary; pattern is easily followed; the grip is close to the blade; and it is well balanced and will not tire the operator's arm, according to the manufacturer. The heating head on this type is hermetically sealed thus giving the knife longer life. Blades are easily replaced when worn out and screw against a tapered surface to insure good heat conduction. The "Straight" type is furnished in the



44-watt size only. The blade in this model is part of the heating chamber and is ventilated so that the guiding hand may be close to the blade itself and remain cool.

Hydraulic Crude Stock Cutter

DESIGNED to cut bales of smoked sheets, crepes, Balatas, Paras, etc., a new hydraulic crude stock cutter, termed Model 4-KB, has been introduced by the Black Rock Manufacturing Company, of Bridgeport, Conn. The new model is self-contained and is equipped with a soap-stoning attachment making the use of water or any other cutting lubricant unnecessary. The feeding forward of the stock is accomplished by the simple turning of a handwheel. The cutting knife makes about four cuts per minute on large bales and more cuts per minute



when the full stroke of the knife is not called for. According to the manufacturer, Model 4-KB is fast, simple, sturdy and reasonable, equipped with 2 cutting knives, a 4-way operating valve, pressure gauge, extra cutting block, and weighs approximately 2,000 pounds. It will cut a ton of smoked sheets into 2" slices in from 30 to 40 minutes. These slices may be diced or cut into almost any shaped pieces to suit millroom requirements.

Editorial Comment

CHRISTMAS morning never dawns,
Its evening never ends,
Without the thoughts of good old times,
The thoughts of good old friends.
—*Selected.*

TO its many friends in the rubber industry THE RUBBER AGE takes this opportunity of extending its best wishes for a Merry Xmas and Happy Days in the coming year.

THE PUBLISHERS

A Better Year Coming

WHETHER or not the new year of 1935 will be the actual pivotal point of definite recovery in the United States, it will most certainly be a better year for the majority of organizations engaged in the rubber industry than has been experienced in several years. That statement is not based on the blind hope of an over-enthusiast but is attributed to facts and data of the last half of the current year.

In 1933 payments of dividends by rubber companies, or suppliers to the rubber industry, constituted a rarity, while announcement of extra dividends hinged on the miraculous. In 1934 these dividend payments were slowly resumed with extra dividends appearing in the news with far more intensity than heretofore. Look at the financial items for the last three months! Profits earned by Goodyear, Goodrich, Fisk, Faultless, Baldwin, Boston Rubber Hose. Dividend payments by United Carbon, N. J. Zinc, Monsanto Chemical, St. Joseph Lead. And several of these companies paid extra dividends to patient stockholders.

Examine the record more closely! From January through September of 1934 *not a single bankruptcy was recorded* for manufacturers of rubber goods. Wholesalers and dealers in rubber goods for the same period reported only one default with involved liabilities of $16,402. The italics are ours, but the figures are supplied by Dun and Bradstreet. Another encouraging point is seen in the fact that despite average wage increases of approximately 27% the employment figures are improved over the previous year as an annual average.

Because of these pertinent facts we see a really and truly better year in 1935—one that will reflect in the two most definite proofs of recovery—increased sales and increased profits.

Labor's Strategy

FROM all appearances labor seems to have followed a special line of strategy in the rubber industry. Under the leadership of an A. F. of L. organizer, Coleman C. Claherty, who probably never saw the inside of a rubber factory until sent to Akron, labor did not work toward a hasty showdown as it did in the automobile industry, nor did it move even as fast toward a strike as witnessed in the textile trade. It did none of these things, but has been concentrating for months on building up its membership with its usual enthusiastic promises, some of which it fulfills.

With organization somewhat effected labor has now set the wheels grinding. It has successfully secured government intervention in the affairs of Goodrich and Firestone, both plants having been ordered to hold employe primaries in their plants to determine whether such employes prefer to continue membership in so-called "company unions" or desire outside union recognition. Should the employes of these rubber factories, swayed by promises of union cooperation along the lines of increased wages and special privileges, decide in its favor, then we may expect to see a recurrence of what Mr. Litchfield, president of Goodyear, in a recent radio speech, described as "an epidemic of strikes."

The pith of the matter is this: with labor in the rubber industry now organized to some extent, it is practically a certainty that the showdown may be expected sometime prior to next summer and very probably during the industry's peak season. Such is the strategy of labor.

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Resume Annual Dinners

AT the large gathering of crude rubber men who helped Robert Badenhop celebrate the 25th anniversary of the founding of his own company last month in New York much favorable comment was heard as to the enjoyment and advantages of get-togethers by men in the same branch of an industry. Regret was voiced that the annual dinners of the rubber manufacturers and the crude rubber men had been dropped a few years back and hope was expressed by many that those functions would again be held beginning at an early date. We agree that the resumption of those dinners would go far toward bringing back that good feeling which existed in the industry in the "good old days" and we urge the Rubber Manufacturers Association, the Rubber Trade Association, the Rubber Exchange, and any other interested organizations in the industry to bring this matter before their respective directorates to the end that the annual dinners may again be part and parcel of the activities of the rubber industry.

CURRENT • NEWS
of the Rubber Industry

DECEMBER, 1934

Extended Labor Battle Looms in Tire Factories On Question of Their Employe Representations

National Labor Relations Board Orders Employe Elections in Firestone and Goodrich Factories— Both Companies Secure Labor Stay on Petitions

AN extended battle between organizations affiliated with the American Federation of Labor and major tire manufacturers faces the industry, one which will most certainly embroil the constitutionality of the now-famous Section 7-A of the National Recovery Act. At present the battle is confined to Akron, with the Firestone Tire & Rubber Company and the B. F. Goodrich Company specifically involved, although the Goodyear Tire & Rubber Company is also playing a major role in the controversy. The outcome of this conflict between the A. F. of L. and rubber company managements, which will undoubtedly take several long months, if not years, is of pertinent interest to every rubber manufacturer in the United States.

The opening gun was fired several months ago when organizers of the American Federation of Labor, led by Coleman C. Clahertv, went to Akron to organize, or unionize, tire workers. At that time the United Rubberworkers council was formed. Soon after initial organization was completed the ever-current question arose as to union recognition. The major tire companies of Akron initially refused to recognize the United Rubberworkers council for collective bargaining on the grounds that they had employe organizations which treated with the questions of the workers, i.e. Goodyear dealt with the Goodyear Industrial Assembly, Firestone and Goodrich with their respective employe conference and co-operative plan organizations, etc.

After being turned down by individual tire companies, and the Rubber Manufacturers Association as well, the rubber union filed an appeal with the National Labor Relations Board, at Washington, D. C., alleging that it had the right to deal collectively with the manufacturers under the NRA. It specifically requested that elections be held in the plants of Firestone and Goodrich, both of which formed so-termed company organizations at about the time unionizers were particularly active in Akron, so that workers should determine whether they preferred representation through existing company organizations or whether they preferred recognition of the United Rubberworkers council as regards employe relationship with their respective managements.

On November 21 the National Labor Relations Board decided in favor of elections for employe representatives in the factories of both Firestone and Goodrich. Elections were ordered within three weeks. Since the petitions merely asked for the calling of elections the Board did not rule on whether the two companies involved had violated Section 7-A of the recovery act.

On November 30 the labor board sent letters of instruction to Firestone and Goodrich setting Friday, December 7, as the date for the elections. The letters were signed by Ralph A. Lind, regional labor director, and included the statement that the decision of the board was "in the public interest" and that "an election by secret ballots of the employes of the production and maintenance departments" be held. It also requested a copy of each company's payroll for purposes of the election. The letter ended with a request for acknowledgement "as promptly as possible."

Elections Postponed

The answer of both Firestone and Goodrich was in the nature of a joint request on December 4 to the United States Circuit Court of Appeals, at Cincinnati, Ohio, that the court set aside the elections ordered for December 7 by the National Labor Relations Board to decide by what labor organization employes prefer representation. The filing of the petition automatically stayed the order of the Labor Board which immediately announced that it would withhold enforcement of its order setting a date for the elections pending the court's review of the whole case.

At this writing (December 8) that is the status of the election situation. The decision of the court will probably not be rendered for several weeks and the elections must be postponed until such decision is handed down by the court. The number of employees involved in both factories total approximately 21,000, of which 12,000 are Goodrich employes, the balance Firestone.

Goodyear Tire & Rubber Company's labor situation is also in a muddle. Early in September the United Rubberworkers council petitioned the labor relations board for the holding of an election at Goodyear similar to those demanded at the Firestone and Goodrich factories. At the same time the Goodyear Industrial Assembly filed an identical request. Tentative approval of the election plan was given Ralph Lind, regional labor director, by President Litchfield on November 27. In a statement accompanying such approval Mr. Litchfield said that "Goodyear does not recognize any current labor problems but if the Goodyear Industrial Assembly desires a vote, we wish to cooperate."

Union Charges Violation

However, on December 2 the Goodyear local of the United Rubberworkers council voted unanimously to amend its request to the National Labor relations board for an employes' collective bargaining election by demanding that Goodyear's industrial assembly be abolished immediately on the grounds that it was an "inside union" and was in violation of Section 7-A of the recovery act. It specifically requested that the company be forced to withdraw its support of the assembly. This amendment came as a surprise to both Goodyear officials and the labor board's officers.

William Cash, president of the Senate of the Industrial Assembly accused the union of being "afraid of the outcome of an honest vote" by this move for abolishment, while John D. House, head of the Goodyear local retaliated with the charge that "the only chance the assembly would have of winning a vote would be through the corrupting influence of company money." He did not explain the reason for the move.

William Green, president of the American Federation of Labor, has taken an active part in the combat. Twice he has hinted at the use of labor's strong-arm weapon—the strike. At a speech in Akron, which was broadcasted, on November 24, he stated that "if corporations know only the law of force then labor still possesses the right to go out on the strike field." When advised that Firestone and Goodrich had petitioned the courts to call off the elections, he made a statement in Washington on December 5 hinting that a strike might result if the two companies were successful in efforts to block employe elections at their Akron factories.

Both Firestone and Goodrich officials have expressed themselves that the National Labor Relations Board has gone beyond its authority in ordering the elections.

Indecision is also felt in the case of the Seiberling Rubber Company. The management has refused to deal with the local of the United Rubberworkers council as to negotiating a wage and hour contract with the result that the local voted on December 2 to refer the matter to the National Labor Relations Board.

REQUEST RECEIVERSHIP FOR KELLY-SPRINGFIELD

Alleging that the Kelly-Springfield Tire Company, with headquarters in New York City, and factories at Cumberland, Maryland, had lost $8,000,000 in the period from 1923-1928, while competitive organizations showed profits, three holders of company notes totaling $422,000 filed an involuntary petition in bankruptcy against the tire company, a New Jersey Corporation, on November 9, in Jersey City, N. J. A hearing was held on November 13, before Vice Chancellor Charles M. Egan.

The petition alleged that the company has suffered heavy losses, that there is dissension among stockholders over the company management, and requested liquidation of the assets. In accepting the petition the court refused to call a special meeting of stockholders on December 11 to elect a president to succeed Edmund S. Burke. On being advised of the petition the latter stated that Kelly-Springfield is in a strong financial position with cash on hand of over $1,000,000 and a ratio of quick assets to current liabilities of better than 16 to 1.

At the same time rumors were rife that Kelly-Springfield was considering a merger with a large tire company. The General Tire & Rubber Company was mentioned in this connection but such allegation was denied by officials of the Akron concern.

RUBBER GOODS EXPORTS SHOW MARKED INCREASE

According to the Bureau of Foreign and Domestic Commerce, exports of rubber goods from the United States during the first 9 months of 1934 were valued at $16,547,214, compared with $12,104,315 in the same period of 1933 and with $12,657,240 in that for 1932—increases of nearly 37 per cent and nearly 31 per cent, respectively. Exports in September ($1,839,616) were about 10 per cent below those in August ($2,038,746), whereas the usual seasonal decline is less than 2 per cent.

All classes of rubber goods participated in the increased exports for the first 9 months of this year as shown in the following comparisons, rubberized fabrics and mechanical rubber goods expanding by the greatest percentage:

Tires and tire sundries and repair materials, from $7,031,798 in the first 9 months of 1933 to $9,537,263 in the 1934 period (36%); rubber footwear, $394,197 to $479,535 (22%); mechanical rubber goods, $1,469,425 to $2,234,603 (52%); rubberized fabrics, $353,916 to $580,470 (64%); rubber sundries and specialties, $758,069 to $952,143 (26%); hard rubber goods, $161,691 to $210,702 (30%); semimanufactured rubber goods, $1,228,117 to $1,632,893 (33%); other rubber products not mentioned elsewhere, $707,102 to $919,605 (30%).

Rubber Concerns Join MEMA

Three rubber manufacturers, Norwalk Tire & Rubber Company, Norwalk, Conn., Eclat Rubber Company, and the Miller Rubber Company, the last two of Akron, Ohio, became members of the Motor and Equipment Manufacturers Association which maintains headquarters in the Fisk Building in New York City. To date the Association has added 75 new members during the current year.

Humane Collar Button

Bid farewell to tortured necks. No longer need man sweat and strain and swear at the indignities associated with the use of collar buttons. For, lo and behold, a benevolent inventor has introduced a humane collar button made of rubber. Formal introduction was made last month at the Exhibition of Inventors held in London, England. To make dressing easy the new stud is attached to the shirt. According to its inventor the rubber collar button can withstand laundering.

Charge Trade Violations

The Henderson Tire & Rubber Company, Bucyrus, Ohio, has been charged with violating trade practices, not having filed a schedule of prices, having a disproportionate number of apprentices among its employes, and with misrepresentation in the sale of its output. The charges were brought by the Ohio Recovery Administration and have been turned over to the Attorney General's office. The Securities Division of the State of Ohio has suspended the registration of the securities of the company, of which C. O. Henderson is president, on submitted testimony that stock in the enterprise was sold on the representation that each stockholder subscribing $100 or more would be given employment at the factory. Other charges involved alleged weekly average wages of $6.00 per employee.

Approve Tire Recommendations

Effective early in November the simplified practice recommendations of the Bureau of Standards, Department of Commerce, for industrial truck and trailer tires of the cured-on type received the required degree of written approval by the industry. These recommended schedules of sizes will be included in the next revision of Simplified Practice Recommendation R103-33 which applies to industrial truck and trailer tires of the pressed-on type. The new schedules for the cured-on type of tire was proposed and developed by the standing committee and includes the stock sizes for such type tires.

Petition for Reorganization

A petition for reorganization of the Poncet Davis Company, and its subsidiary, the Banning Cotton Mills, Banning, Georgia, was filed on November 19 in the Federal Court at Cleveland, Ohio. Accompanying the petition was a request asking for extension of debts of Poncet Davis, sole owner of the company. To date no plans for reorganization have been completed. The petitioning companies manufacture cotton fabric for tires.

Fisk Increases Production

Fisk Rubber Corporation, Chicopee Falls, Mass., has considerably increased tire production in the past few weeks with a subsequent increase of the factory force from 1,200 to 1,500 workers. Improved orders for future deliveries are said to be responsible, in part, for this increase as well as a substantial order from Scandinavia for truck tires.

OCTOBER CONSUMPTION 3.3% OVER SEPTEMBER

Consumption of crude rubber by manufacturers in the United States for the month of October amounted to 31,347 long tons, which compares with 30,352 long tons for September. October consumption shows an increase of 3.3% over September, but was less than 1% below October a year ago, according to statistics released by The Rubber Manufacturers Association. Consumption for October (1933) was reported to be 31,543 (revised) long tons.

Imports of crude rubber for October were 35,298 long tons, an increase of 22.4% above the September figure of 28,835 long tons, but was 17.9% below the 43,016 long tons imported in October, 1933.

Total domestic stocks of crude rubber on hand October 31st, were 362,018 long tons, which compares with September 30th stocks of 359,667 long tons. October 31st stocks show an increase of less than 1% above September 30th stocks, and 4.6% above stocks of October 31, 1933.

The participants in the statistical compilation report 38,247 long tons of crude rubber afloat for United States ports on October 31st, compared with 38,831 long tons afloat on September 30th, this year, and 58,568 long tons afloat on October 31, 1933.

October reclaimed rubber consumption is estimated to be 8,167 long tons; production 8,145 long tons; and stocks on hand, October 31st, 24,511 long tons.

TIRE SHIPMENTS DROP 26.1% BELOW AUGUST

Shipments of pneumatic casings for the month of September amounted to 3,182,903 casings, a decrease of 26.1% below August, this year, and 9.1% below September (1933), according to statistics released by The Rubber Manufacturers Association, Inc.

Production of pneumatic casings for September was 2,935,958 casings, a decrease of 16.9% under August and 26.6% below September, 1933.

Pneumatic casings in the hands of manufacturers on September 30th amounted to 8,418,960 units, a decrease of 3.2% below stocks on hand August 31st, 1934, but were 10.9% above stocks September 30, 1933.

The actual figures are as follows

PNEUMATIC CASINGS

		Shipments	*Production*	*Inventory*
Sept.,	1934	3,182,903	2,935,958	8,418,906
Aug.,	1934	4,308,270	3,532,631	8,697,151
Sept.,	1933	3,503,365	3,999,239	7,594,506

Erecting Alkali Factory

Production has been started on a $7,000,000 factory by the Southern Alkali Corporation, at Corpus Christi, Texas. The company has executive headquarters in the Empire State Building, New York City. The factory, when completed, will manufacture several alkalis used in the rubber industry. The company is jointly owned by the Pittsburgh Plate Glass Company and the American Cyanamid Company.

Glyco Sales Offices Moved

The sales and purchasing departments of the Glyco Products Company, Brooklyn, N. Y., were removed to the Flat Iron Building, New York City, on October 1. The laboratory and plant remain in the Bush Terminal in the Borough of Brooklyn.

Rubber Groups Hold Meetings and Celebrations With Lectures and Elections Holding Spotlight

RUBBER groups throughout the country, affiliated with the American Chemical Society, held, are holding and will hold their annual meetings and Christmas celebrations during the months of December and early January. In most of the groups new elections are taking place, while practically every group meeting is being addressed by some prominent rubber executive. Entertainment in the Xmas spirit is being stressed by many of the groups.

New York Rubber Group

The New York Rubber Group held its annual meeting and Christmas Party on Friday night, December 14, just as this issue went to press, at the Building Trades Employers Association club rooms, at 2 Park Avenue in New York City. The Nominating Committee, named at the previous meeting, consisting of W. O. Hamister, K. J. Soule and M. R. Buffington, brought in the following slate for 1935 officers of the group: Bruce R. Silver, N. J. Zinc Company, chairman; William M. Morse, *India Rubber World*, secretary-treasurer; members of the Executive Committee, C. J. Wright, General Atlas Carbon Company; R. E. Casey, Naugatuck Chemical Company; J. Miscall, Flintkote Company; O. M. Hayden, E. I. duPont de Nemours & Company; D. A. Shirk, Rare Metal Products Company; E. D. Yoemans, Okonite Company; Fred Conover, Manhattan Rubber Mfg. Company; and W. H. King, Pocono Rubber Cloth Company.

Two interesting speakers addressed the meeting, E. A. Hauser and Hugh Herndon. Prof. Hauser, brother of W. J. R. Hauser of the Heveatex Corporation, who is an internationally known colloidal chemist and physicist, arrived in the United States a few days prior to the meeting. He is chief chemist of the Semperit Austro-American Rubber Works, of Vienna, Austria. He discussed recent developments in latex technology. An account of Mr. Hauser's talk follows:

"Recent literature searches in regard to the direct application of latex in the manufacture of rubber goods have revealed so far unknown highly interesting publications in the years 1905 to 1908. These findings close the gap so far existing between the papers and patents published by Thomas and Charles Hancock and co-workers and the first publications of Ernest Hopkinson and his staff in 1919-20. A short discussion of this so far known literature was given.

"The development of direct application of latex since 1919 was briefly referred to solely for the purpose of giving a basis for the discussion of the more recent developments. Improvements in the production of specific latex compounds for various purposes as a result of colloid chemical methods and their special advantages were discussed and problems still to be solved in this respect were enumerated.

"Progress in the fields of manufacturing dipped goods, rubberized fabrics and their complete inpregnation, the manufacture of specialities in the field of artificial leather and the production of rubber threads were given. Recent developments in the use of latex compounds for the purpose of obtaining hollow cast rubber goods and the like were also referred to as were several special applications of latex. A general outlook in regard to further development as based on our present knowledge was given in conclusion."

Hugh Herndon, who flew around the world several years ago with Clyde Pangborn, and participated in the award of $25,000 from the Japanese government along with Mr. Pangborn for being the first two fliers to cross the Pacific Ocean, spoke on "My Flight Around the World." Mr. Herndon devoted a good portion of his talk in telling of his personal experiences on these round-the-world jaunts. He is now associated with the Cities Service Company.

Following is a list of companies who have contributed prizes awarded at the meeting up to this date (Wednesday, December 12): Southwark Mfg. Co., R. T. Vanderbilt Co., General Atlas Carbon Co., THE RUBBER AGE, Naugatuck Chemical Co., Henry L. Scott Co., *India Rubber World*, Vansul, Inc., Joseph R. McNulty, Cities Service Co., Vulcan Proofing Co., National Sherardizing & Machine Co., E. I. du Pont de Nemours & Co., Inc., United Carbon Co., J. M. Huber, Inc., Givaudan-Delawanna, Inc., Endicott-Johnson Corp., Somerset Rubber Reclaiming Co., C. J. Tagliabue Mfg. Co., American Cyanamid Co., Wishnick-Tumpeer, Inc., Imperial Color Works, Binney & Smith Co., N. J. Zinc Co., Woburn Degreasing Co., U. S. Rubber Reclaiming Co., Stamford Rubber Supply Co., Carter Bell Mfg. Co., Lea Fabrics Co., Rubber Service Laboratories Co., Curran & Barry, Philadelphia Works Co., and Rare Metal Products Co.

Left: Bruce R. Silver, of the New Jersey Zinc Company, newly elected chairman of the New York Rubber Group, A. C. S. for 1935 season.

Right: E. A. Hauser, chief chemist, Semperit Austro-American Rubber Works, of Vienna, who addressed N. Y. Group at latest meeting.

Akron Rubber Group

A record crowd of 260 people attended the Winter meeting of the Akron Rubber Group at the Akron City Club on Friday evening, December 7. Prior to the meeting groups of rubber men congregated around the Oyster Bar for a brief social period, with plentiful helpings included in the ticket of admission.

Although two speakers were scheduled for the evening, one of them, W. B. Weigand, of Binney & Smith Company, was unable to attend due to a sprained ankle received in New York. He wired his regrets to the Group. The second speaker scheduled, R. O. Bishop, until recently chief chemist of the Rubber Research Institute of Malaya, extended his talk to cover the allotted time and, according to report, did an excellent job. Mr. Bishop visited this country in the Summer of 1933, and returned for a second visit arriving on November 24. He was due to sail for England on December 10.

Mr. Bishop spoke on "Recent Developments on Latex Production," illustrating his subject with an interesting movie film and lantern slides. The pictures told the story of all the operations carried on in the Far East from the growing of the trees to the completed product. The process of bud grafting was also shown, as well as modern methods of handling and transporting latex at the plantation factories including the large storage tanks for bulking and blending the latex to make it uniform.

Latex is a vegetable product, and Mr. Bishop made it clear that like all such products it is variable by nature. The condition of the soil, nature of the planting, type of labor employed, and the season of the year all contribute to the variations experienced. Charts were shown giving the variations in non-rubber constitutes and other chemical and physical characteristics of latex collected each month over a period of one year.

In concluding his address the speaker urged better cooperation between producers and consumers. He suggested that if consumers received shipments which are off color or not otherwise satisfactory that they advise the producers promptly. Likewise, the producers would appreciate being advised when consumers receive good lots which are particularly satisfactory in manufacturing their products. This sort of cooperation would go a long way toward bringing latex up to the standards of uniformity desired.

Chicago Rubber Group

Coinciding with the Christmas Party held in New York City by the New York Rubber Group, the Chicago Rubber Group staged its First Annual Christmas Party on Friday night, December 14. Although this issue of THE RUBBER AGE went to press prior to the actual holding of the festival, it is presumed that the same atmosphere of fun and frolic prevailed as witnessed by other divisional groups on such occasions.

Dinner was held in the College Inn of the Hotel Sherman, reserved by the Group for the evening, with entertainment furnished by George Olson and his orchestra aided by the inimitable Mrs. Olson, far better known as Ethel Shutta. Additional entertainment was planned for the evening.

The only speaker scheduled for the combined meeting and party was William B. Weigand of Binney & Smith Co. He was scheduled to discuss his experiences in the Far East based on his recent trip. He has given similar talks on the subject before both the New York and Rhode Island Rubber Groups.

(Continued on page 141)

Names in the News

DR. WILLIAM C. GEER, former vice-president and research head of B. F. Goodrich Company, addressed the American Institute of Chemical Engineers on "Aircraft Appliances" in Pittsburgh on November 15.

E. E. PARDEE, assistant export manager, Firestone Tire & Rubber Company, has returned to the Akron offices after a six months' trip around the world.

E. R. SEAGER, Pennsylvania Rubber & Supply Company, Cleveland, was one of the committee in charge of arrangements for the Automotive Service Industries Show held in Cleveland last month.

WILLIAM O'NEIL, president, General Tire & Rubber Company, Akron, embarked last month on a business trip which included visits to the company's branches on the Pacific Coast. He made the entire trip by plane.

A. B. MERRILL, mechanical goods engineer, B. F. Goodrich Company, Akron, attended the annual meeting of the American Petroleum Institute in Dallas, Texas, on November 12. He is chairman of the Institute's National Belting committee.

HARRY J. SMITH has been placed in charge of the recently-opened export office of the Black Rock Manufacturing Company, Bridgeport, Conn. The export division is maintained at 277 Broadway in New York City.

PAUL W. LITCHFIELD, president, Goodyear Tire & Rubber Company, Akron, urged a national program of unemployment insurance in a talk before the Southern Division of the U. S. Chamber of Commerce in Birmingham, Alabama, on November 19.

W. A. JOHNSON, formerly associated with the B. F. Goodrich Company, has established a buying pool under the name of Associated Manufacturers of America in the wholesale merchandising field. The pool includes more than 100 big city department stores.

FRANKLIN R. HOADLEY, vice-president, Farrel-Birmingham Company, Inc., Ansonia, Conn., spoke on "Relief, Recovery and Reform" before the Providence (R. I.) Section of the American Society of Mechanical Engineers on November 9.

ARTHUR C. HORROCKS, director of education for the Goodyear Tire & Rubber Company, Akron, outlined the four qualities for intelligent followership to some 200 members of the Stark County Foremen's Club at Alliance, Ohio, on November 14.

DR. G. M. MORTATI, for many years vice-president of the Superfos Company, importers and exporters of heavy chemicals, has joined Wishnick-Tumpeer, Inc., of Chicago and New York, as manager of the Foreign Department.

H. WALTER GROTE, of the Research Division, United Carbon Company, Charleston, W. Virginia, and Mrs. Grote, sailed on the S. S. Washington on December 14 for a three months' vacation abroad including visits in France, Italy, Germany, Belgium, Switzerland and Holland.

EARL GULICK, recently appointed superintendent of the Goodrich Canadian plant at Kitchener, Ontario, visited the Akron factories last month where he formerly served as superintendent of the tire division.

J. E. SEARLE, of Springfield, Mass., resigned as a director of the Kelly-Springfield Tire Company on November 23. He was elected to the board of directors in May, 1934.

L. L. SMITH, assistant treasurer, B. F. Goodrich Company, Akron, was elected vice-president of the Motor & Equipment Manufacturers' Association on November 22. He has been a director of the association for some time.

GEORGE BILLS, assistant manager of the Van Cleef Brothers, Chicago, World's Fair exhibit, has been appointed Southeastern divisional sales manager of that company. He replaces H. A. WRONKER who recently resigned from that post.

HARRY M. GREEN has been appointed manager of Mechanical Goods Sales, Pacific Coast Division, of U. S. Rubber Products, Inc. In his new post he will coordinate his activities with those of J. B. BRADY, general manager of the western division.

GEORGE E. SPROWELS, manager, Highway Transportation department, Goodyear Tire & Rubber Company, Akron, presented an illustrated slide lecture on rubber before the motor transportation division of the Cleveland Safety Council on December 3.

FATHER J. A. NIEUWLAND, of Notre Dame University, often called the founder of synthetic rubber, discussed the commercial production of such rubber before the Indiana Academy of Science meeting at Indianapolis on November 17.

F. B. DAVIS, JR., president, U. S. Rubber Company, New York City, has accepted the post of chairman of the Rubber Industry Division of the Commerce and Industry Committee of the Citizens Family Welfare Committee. The committee has announced a minimum goal of $2,000,000.

WARD T. VAN ORMAN, of the Goodyear Tire & Rubber Company, Akron, famous balloonist, spoke on "Ballooning Adventures Among the Clouds" on November 27, at a meeting of the Cleveland Engineering Society held at the Hotel Statler, Cleveland.

C. C. DAVIS, chief chemist, Boston Woven Hose & Rubber Company, Cambridge, Mass., boarded the S.S. Rex on November 9 for a short vacation trip in Europe.

H. L. KENWARD, sales director, Dunlop Rubber Company, Ltd., presented a paper favoring the control and licensing of every distributor and retailer of any manufactured commodity at a meeting in London of the Institute of Motor Trade last month.

M. J. FLYNN, president, Inland Rubber Company, Chicago, has been elected County Clerk of that city. He has been active in local politics for many years.

Litchfield Speaks on "Forum"

Paul W. Litchfield, president, Goodyear Tire & Rubber Company, Akron, was the featured speaker on one of the "Forum of Liberty" radio programs, sponsored by *Liberty Magazine*, on the Columbia Broadcasting System, last month. His topic was the needed cooperation between labor and capital pointing out that a fair balance must be maintained between the two. Mr. Litchfield stressed the importance of labor and capital working hand in glove to eliminate the current epidemic of labor strikes.

To Tap Firestone Trees

On the eve of his departure for Liberia, Harvey S. Firestone, Jr., on December 3, revealed that 6,000 acres of rubber trees on the Liberian plantations owned and cultivated by the Firestone Tire & Rubber Company, of Akron, are about ready for tapping. These trees will be the first tapped for rubber since the Firestone project was started. Accompanying Mr. Firestone to Liberia were W. T. Runals, engineer; Dr. P. C. Grigg, plantation hospital head; H. W. Heilman, plantation manager; and a hospital nurse.

WILLIAM H. BALCH, formerly executive vice-president of the Faultless Rubber Company, Ashland, Ohio, was elected president of that company by its board of directors on December 3. He has been with the company for 18 years.

COLONEL D. M. GOODRICH, chairman of the board, B. F. Goodrich Company, Akron, and the son of the company's founder, was awarded a 20-year service pin on December 1 by President J. D. TEW.

DR. H. L. TRUMBULL, chemical research manager, B. F. Goodrich Company, was called to Vancouver, British Columbia, last month, by the serious illness of his mother.

L. E. JUDD, public relations manager, Goodyear Tire & Rubber Company, Akron, was elected a trustee of the Akron Chamber of Commerce on November 27. There are 16 trustees in all.

EARL LANDERS, who has represented the B. F. Goodrich interests in southwestern California for the past four years, has been promoted to the managership of the Denver, Colorado, district.

ARMAND MCCOLLISTER, Firestone Tire & Rubber Company, has been transferred to the Argentina offices of that company. Accompanied by his wife Mr. MCCOLLISTER sailed early in November.

PROF. EDWARD MACK, of Ohio State University, discussed the "Structure of Rubber" before the Akron Section of the A.C.S. on November 21. A dinner preceded the lecture.

R. M. DINSMORE, who has won national honors as a tire salesman, has joined the Mohawk Rubber Company as a special representative in the Southern territory operating out of Atlanta, Georgia.

DR. K. H. QUASEBARTH, who recently made extensive studies in Europe on the newest developments on the application of Revertex, has joined the Revertex Corporation of America, New York, as a technical advisor.

K. B. KILBORN, who has been in South America for the last two months in behalf of the Seiberling Tire & Rubber Company, returned to Akron last month.

Financial News

FIRESTONE TIRE EARNS 71 CENTS ON COMMON

Firestone Tire & Rubber Company, Akron, and subsidiaries, for the year ended on October 31, 1934, reported on December 3 net profit of $4,154,655 after all charges, equal to 71 cents a share on its $10 par shares of common stock, after the payment of dividends on its Series A 6% cumulative preferred stock. In the preceding fiscal year the company earned $2,397,059 after similar deductions, or $5.13 a share on 466,902 shares of Series A 6% preferred stock. Current profit is one and a half times as much as that reported for 1933.

Current assets on October 31 were reported to be $62,087,150, including $10,614,594 in cash. Current liabilities were shown as $14,302,315. Current assets in the report for the preceding fiscal year were set at $56,766,302.

In making public the report, Harvey S. Firestone, chairman of the board, also announced a 31% increase in sales for the period just ended over the previous fiscal year. He also stated that the company gave employment to 28% more people than in the preceding year, that payrolls were 65% greater, and that the average hourly wage was 14% higher than in 1929. Firestone sales for the fiscal year just ended were $99,130,243, compared with $75,402,268 for the year ending October 31, 1933.

RAYBESTOS-MANHATTAN INCREASES ITS PROFIT

Raybestos-Manhattan, Inc., Passaic, N. J., earned net income of $892,838.55 during the first nine months of 1934 ending September 30. This compares favorably with net income of $694,777.03 earned for the same period of 1933. Income for the current period is equivalent to $1.39 per share compared to $1.08 per share in the preceding year.

Total assets revealed by the balance sheet amount to $16,451,829.98, including approximately eight million dollars of current assets, which is equivalent to 13 times the current liabilities of $599,291.35 at the close of the period. The company has no banking or funded debt or other capital obligations.

Along with the nine-month report the directors declared a dividend of 25c per share, payable December 15, 1934, to stockholders of record on November 30, 1934.

Boston Hose Profit $113,853

Boston Woven Hose & Rubber Company, Cambridge, Massachusetts, showed a net profit of $113,853 for the fiscal year ending August 31, 1934. This was reported as only $13,853 in our previous issue. The net income was equal to 80c a share on 86,000 common shares after the payment of 6% preferred dividends.

Goodrich Stock Cancellation

The Bankers Trust Company served notice on the New York Stock Exchange, on November 19, as trustee under the B. F. Goodrich Company mortgage dated July 1, 1922, that it had released through the Goodrich concern for cancellation 8,000 shares of no-par capital stock of the Pacific Goodrich Rubber Company. A supplemental indenture covering all property acquired by the parent concern from the western unit has also been filed with the Bankers Trust Company.

Norwalk Tire Has Profit

Norwalk Tire & Rubber Company, Norwalk, Connecticut, reports net profit of $11,324 after depreciation, provision for doubtful accounts, Federal excise taxes, and other charges, for the year ended September 30, 1934. This is equivalent to $1.23 per share on 9,184 $50 par shares of 7% preferred stock. This compares with profits of $73,556 in the preceding year equal, after preferred dividend requirements, to 20c per share on 197,705 no-par common shares.

Profit for Baldwin Rubber

Baldwin Rubber Company, Pontiac, Michigan, reports net income for the nine-month period ending September 30, 1934, after deducting expenses, taxes, etc., at $91,664 equal to 36c per share on 100,770 Class B shares, after deducting Class A dividend requirements. The company shows a net loss of $8,943 for the quarter ending September 30, 1934, however, contrasted with net income of $42,033 in the previous quarter. Baldwin Class B stock earned 40c a share in the first quarter of 1934.

INDIA TIRE CO. FIGHTS RECEIVERSHIP ACTION

Two stockholders of the reorganized India Tire Company, Akron, charging that $800,000 has been lost through mismanagement since the first of the current year, filed suit in the Portage County Common Pleas Court, in Ravenna, Ohio, on November 26, asking that a receiver be named for the company. Officers of the company and five directors were named in the suit. C. T. Morledge, vice-president and company spokesman, charged the suit with being "a conspiracy by certain lawyers to plunder the company."

Reorganization of the company was worked out about six months ago, with settlements to creditors made largely in cash. The current management maintains losses have been shown by the company by sales at low figures to pay off a bank loan of $155,000 obtained to work out the reorganization.

At a court hearing on December 3, Judge C. H. Curtiss, in the Ravenna common pleas court, denied a motion made by the company to dismiss the action for lack of jurisdiction. W. G. Klauss, president, revealed details of the financing which permitted reorganization of the old India Tire concern. Donald Gottwald, attorney for India Tire, claimed that the original receivership had not been discharged and that Paul C. Weick, orginal receiver, is still in technical control of the company and will be until the new management pays off Federal and county taxes as set up in the reorganization plan.

Chicago Rubber Group

(Continued from page 137)

An air of deep mystery surrounded the other arrangements for the annual affair prepared by the committee in charge. The announcement of the party stated that the "Committee has agreed that no report will be made on the balance of the program other than that 'a good time was had by all'." C. E. Frick of Van Cleef Brothers, Chicago, was in charge of the program.

Boston Rubber Group

The Boston Rubber Group has set January 7 as the tentative date for its next meeting. Dr. E. A. Hauser is scheduled to speak on a new subject, "Casted Rubber." Dr. Hauser also addressed the members of the New York Rubber Group on the night of December 14 at its combined meeting and Christmas Party. J. J. Sindler, of the Converse Rubber Company, Malden, Massachusetts, is chairman of the Boston division.

At a business meeting held early in December plans were formulated for 1935, including the creation of an executive committee. The names of J. J. Sindler and W. J. R. Hauser were submitted for chairman and secretary-treasurer, respectively. Five members were recommended for the executive committee including: John M. Bierer, John T. Blake, Stanley Krall, Royce J. Noble and James M. Scott.

Goodyear Defense Continues

With hearings now in Washington, D. C., the Goodyear Tire & Rubber Company, Akron, is continuing its defense against anti-trust charges brought by the Federal Trade Commission. The past month has been devoted to testimony with regard to statistics introduced by Goodyear, particularly referring to its company-owned stores, which operated at a loss from 1926 to 1933, according to C. H. Brook, Goodyear comptroller.

Trustee for Inland Rubber

Inland Rubber Company, Chicago, has petitioned the U. S. District Court, for the Northern District of Illinois, for the right to reorganize the company under Section 77 B of the Acts of Congress relating to Bankruptcy. A hearing is to be held on December 27 before Judge James H. Wilkerson at the U. S. Court House, in Chicago. A. D. Plamondon has been appointed temporary trustee of the company.

Buy Christmas Seals

Help Fight Tuberculosis

NEW ENGLAND NEWS

The Omo Mfg. Company, Middletown, Conn., recently acquired by Brooklyn, N. Y., interests, has let contracts for construction of an addition to its plant on Walnut street, Middletown. It will be of brick, 20 x 25 feet, one story high.

Officers of the same company have formed a new corporation, Middletown Rubber Corp., to manufacture and deal in rubber cement, rubberized material, etc. Authorized capital stock is $50,000, of which $2,000 is paid in. Incorporators are Martin Schnur, and Irving Segal, of Middletown, and Henry Schneider, Brooklyn, N. Y.

Net profit of $11,234 for the year ended September 30, is reported by the Norwalk Tire & Rubber Company, Norwalk, Conn. This is equivalent to $1.23 on the 7 per cent preferred stock. John W. Whitehead is president of the company.

Jenkins Bros. Company, Bridgeport, Conn., mechanical rubber goods, has reemployed 100 men to meet improved business demand, according to Bernard J. Lee, vice-president. The company has sandblasted its entire plant and plans to erect an electrical fountain on its property as a means of improving appearances. Mr. Lee has sailed for Europe on an extended business trip.

Fisk Rubber Corp., Chicopee Falls, Mass., is reported to have received an order for tires amounting to $2,500,000 from Western interests. Production at the plant during November was at the rate of about 6,000 tires daily, and reports indicate that the figure will be increased to nearly 8,500 after January 1.

U. S. Rubber Products Company, Inc., Naugatuck, Conn., has stepped up production in December to a five-day basis, which was to be maintained throughout the month if business prospects materialized, according to Walter H. Norton, factory manager. Up to now the plant has operated on a varying basis of two, three and four days a week. Mr. Norton pointed out that weather conditions in December would materially affect the schedule.

RUBBER SCIENTIST DIES IN PERFECTING PROCESS

Dr. Eric von Gebauer-Fulnegg, scientist and former member of the faculties of Princeton and Northwestern Universities, died a martyr to the rubber industry on November 18 at the Passavant Hospital, Chicago. Death was caused from the effect of inhaling hydrochloric acid gas during an experiment in a chemical laboratory in Gary, Indiana, several days previous. He was 33 years old and had been in this country since 1926.

The unfortunate death of Dr. Gebauer revealed a new development in rubber treatment claimed by its sponsors to be of revolutionary scope. It was on the eve of completion of this discovery that the deceased, in an effort to hasten the solution, inhaled the fatal acid gas rather than wait for an air pressure machine to force the gas from one tank to another. The rubber treatment upon which he was working is said to be an evolution resulting from ten years of research for a satisfactory wrapping material for food and kindred purposes.

According to E. M. Kratz, chief of the Gary laboratory with which Dr. Gebauer was associated, more than $500,000 has already been expended in the search for this wrapping material.

Among the more important uses the new rubber treatment will make available when finally concluded are the following:

A method of coating translucent paper with rubber giving a transparent wrapper impervious to moisture, which seals itself under heat, is unaffected by extreme cold and indifferent to time. (Because these qualities so closely resemble those claimed for Pliofilm, Goodyear's new transparent rubber product, concerning which little information has been released, it is believed Goodyear was backing Dr. Gebauer's experiments.—Editor).

A rubber fabric that can be spun into synthetic cloth with the desired qualities of rubber retained after its physical properties have been changed so that it is chemically stable, impervious to moisture, fats and oil.

Rubber as an ingredient for paint that is especially valuable in treating structural steel or water-proofing cement, because it is protection against corrosion and fumes, water, acids and alkalies.

A new fabric for dielectric (insulation) uses adaptable to radio construction and other purposes.

A rubber for molding purposes in the fashion of compositions now seen in a multitude of everyday objects such as pipes, light plugs and ash trays.

Mr. Kratz made it plain that the processes are still of a secret nature and that the treatment is only in a semi-production state. The several uses that suggest themselves, according to Mr. Kratz, are in a minority compared to the total number of purposes to which the new rubber treatment can be put. An early major step, soon to be publicly announced, is the transformation of raw rubber into rubber hydrochloride, a process which under normal methods involves considerable time but which the new method makes available in approximately three minutes.

Eagle Rubber in Violation

The National Labor Relations Board, at Washington, D. C., decided on November 11 that the Eagle Rubber Company, Ashland, Ohio, had failed to bargain collectively with its employes and therefore was in violation of Section 7-A of the National Recovery Act. The board ruled that the decision, originally handed down by the Cleveland Regional Labor Board, and concurred in by the old National Labor Board, was final. The case was referred to the NRA Compliance Director of Ohio for settlement.

N. Y. Auto Show Due

The Annual New York Automobile Show will be staged in Grand Central Palace, New York City, the week of January 5 to 12. Few major or radical changes in motor or chassis are indicated by advance reports. Practically all display space available has been contracted for by exhibitors.

QUOTA ANNOUNCEMENT STIRS RESENTMENT HERE

Recent announcement of the restriction quota, set at 75% for the first 3 months of 1935, by the International Rubber Regulation Committee, sitting in London, has stirred some resentment in domestic rubber circles, according to report. It is the belief of certain rubber manufacturers in this country that their interests should be given a direct voice in executing the present restriction scheme.

At present, rubber consumers are given voice in the plans of the committee via an advisory panel, of which Colonel Townsend is the American representative, which acts in a consultory manner. It is the feeling of American manufacturers that the functions of the advisory panel should be expanded so as to give it an actual vote at the committee meetings. According to reports from London the advisory board was permitted to attend the first meeting of the regulation committee only and was not in at the final decision.

Akron tire manufacturers are said to be paying little attention to these reports. A. D. Moss, director of purchases for Goodrich, stated: "It isn't reasonable to suppose that the producers would ask consumers what they thought of a program designed to increase prices to the latter." Goodyear officials are said to have indicated a similar attitude.

Organize Rubber Company

Carson and Shadrock, attorneys, 820 Renkert Building, Columbus, Ohio, filed incorporation papers on November 27 at Columbus for a new rubber company. The new concern will be known as the Admiral Rubber Company, with headquarters in Canton, Ohio. It was financed by 100 shares of no-par common stock. Russell J. Burt, Mary L. Rose and Beatrice Alcorn were the incorporators.

TRENTON NEWS

Murray Rubber Company, Trenton, N. J., is now producing a new and heavier inner-tube known as "Tri-Pli."

Rubber Displays, of 15 West State Street, Trenton, N. J., has been incorporated with $100,000 divided into 10,000 shares of $10 each to manufacture various kinds of rubber products. The incorporators are Mitchell Carter, Ewing Township, Trenton, 4800 shares; Edward B. Carter, Lexington, Mass., 5,000 shares; and William C. Wall, Ewing Township, Trenton, N. J., 25 shares.

The annual meeting and dinner of the Rubber Manufacturers' Association of New Jersey will be held on December 11 at the Trenton Club when officers will be chosen for the coming year. John A. Lambert, president of the organization, is completing arrangements for the event

The American Hard Rubber Company, Butler, N. J., has signed an employer-employe agreement which increases the hourly wage scale and improves working conditions. The agreement also affects the Akron, Ohio, plant of the company. The agreement does not call for a closed shop, but provides for union recognition. About 1200 are employed at both plants.

BADENHOP CO. HOLDS ITS 25TH ANNIVERSARY

More than 150 friends of Robert Badenhop, well known crude rubber executive of New York, joined him in celebrating the 25th anniversary of the founding of the Robert Badenhop Corporation, on Friday, November 23, when they gathered at the Postkeller in the Woolworth Building to enjoy a buffet supper tendered by the officers of the company. Among the guests who felicitated Mr. Badenhop were all of the leading rubber importers, brokers and dealers representing every crude rubber firm in New York City.

Robert Badenhop has been in the crude rubber business for 33 years, having first been on Mincing Lane in London, followed by a short period in Hamburg. He came to the United States in 1907 and after two years with several brokers and dealers he branched out for himself by founding his own business. That business has expanded greatly and now consists of a large staff in New York with connections in all of the world rubber markets.

Mr. Badenhop married a New York girl and now has three children, a son, Robert A., student at Amherst, another son, Norman, attending preparatory school in Newark, N. J., and a married daughter.

In addition to his duties as president of his own company Mr. Badenhop is vice-president and director of the Rubber Trade Association, a director of the Commodity Exchange, and a director of the Rubber Exchange Clearing House. Other officers of the Robert Badenhop Corporation are: G. LeRoy Scheinler, vice-president; Murray Millenthal, treasurer; J. F. Kiernan, secretary. The company maintains offices in the Woolworth Building in New York City.

ENGLAND AND GERMANY IN RUBBER AGREEMENT

According to advices from abroad an agreement has been entered into between British and German rubber interests which will enable Germany to continue and possibly increase her purchases of British Empire rubber. The pact was signed by both the German rubber controller and the Rubber Trade Association of London.

The pact was deemed necessary because German interests already owed considerable sums to English interests for rubber already delivered to the former country. Under terms of the pact these debts will be settled by installment payments spread over a nine-month period. The agreement also provides for accelerated payments in the event the German concerns involved find themselves in a position to make larger payments. Because of the signed agreement British suppliers of rubber are continuing to supply German companies under existing contracts on a basis they believe gives them ample security regarding future payments.

Shipments Exceed Quota

According to a dispatch from the Central Bureau for Statistics at Batavia, exports of native rubber from the Netherland East Indies for the June-September period, the first four months of restriction, exceeded the quota by 14,200 tons.

ROBERT BADENHOP

Starts National Advertising

The Mishawaka Rubber & Woolen Manufacturing Company, Mishawaka, Indiana, after an absence of five years, has returned to the national advertising field via class journals and daily newspapers in an effort to recover the large share of the fall and winter rubber footwear market formerly held by the company. The present campaign has been designed to popularize the red ball trade-mark with which the concern's footwear products are identified. This trade-mark has been used by the company for three generations. The advertising copy is designed to attract both consumers and dealers.

Approve Tape Specifications

The American Society for Testing Materials, Philadelphia, Penna., recently approved a number of changes in standards under the jurisdiction of Committee D-11 on Rubber Products. Because of considerable criticism of the Tentative Specifications for Rubber Insulating Tape (D-119—32-T), particularly concerning the fusion test and quality requirements, the specifications have been completely rewritten. Tentative Specifications for Insulated Wire and Cable, Class AO, 30% Hevea Rubber Compound (D-27—33T) were revised last June, and now with the completion of tables on thickness of insulation and test voltage, are considered to be in acceptable form.

Publish New House Organ

To be published monthly under the name of "Witcombings" a new attractively put-together house organ has been started by Wishnick-Tumpeer, Inc., of Chicago and New York, manufacturers of pigments and compounding materials. The house organ is devoted to rubber, paint and ink and combines amusement with education even unto the mixing of new cocktails. It is edited by C. H. Hazard.

Mansfield Tire Expanding

Mansfield Tire & Rubber Company, Mansfield, Ohio, has increased operations 50% to give additional work to the 800 factory employes prior to the Christmas Holidays. The new schedules, which have boosted operations to 50% of plant capacity, are to continue at least until January 1, 1935, according to officials of the company.

CHEMIST SEEKS PATENT ON POINSETTIA RUBBER

Herman E. Pitman, a chemist of St. Louis, Missouri, who worked for a number of years under Thomas A. Edison, Harvey Firestone, Sr., and John Burroughs, applied for a patent on November 6 to obtain protection for a formula by which he claims 60% of the rubber requirements of the United States may be extracted from a species of poinsettia. According to Webster the poinsettia is "a Mexican shrub with rich red leaf-like bracts." It thrives in southern states and is extensively cultivated in Florida particularly intended for the Christmas Holidays because of its decorative qualities.

Mr. Pitman had included the poinsettia with others in his research work and found that while rubber sap was abundant in the plant its treatment did not give encouraging results. Quite by accident, according to report, while experimenting with the plant for another purpose, the chemist stumbled upon a chemical formula which converted the apparently "hopeless weed sap" into a latent rubber which is said to have evaded the chemists working under the Edison project which is now in the hands of the Department of Agriculture.

A discouraging feature of the poinsettia plant sap, reports Mr. Pitman, was its tendency to become rancid quickly. It was while trying to devise a treatment to keep the sap sweet until it could be worked out, that he found a chemical combination which will enable rubber to be extracted from the plant species.

Mr. Pitman also pointed out that all of the gulf states are capable of growing the poinsettia, now cultivated only for its floral beauty, and that millions of pounds of rubber can be produced from the available lands in this district. He further stressed the fact that from the planting of the plant to the production of rubber will require only 8 months, whereas rubber from the Para trees requires 5 to 8 years growth. Plans are said to be already under way for plantings of poinsettia on muck land in the Florida Everglades. A number of valuable accidents have figured in the making of rubber and rubber products.

DOMESTIC TIRE FIRMS MAINTAIN WORLD TRADE

Compared with 21 and 22% in 1933 and 1932, respectively, the share of the United States in the world's tire export trade increased to 23% in the first 9 months of 1934, reports the Leather-Rubber-Shoe Division of the Department of Commerce.

Tire exports from principal manufacturing countries in the January-September period of 1934 totaled 4,110,000 units, against 4,155,000 and 3,835,000 units, respectively, in the corresponding periods of the two preceding years, statistics show.

Principal countries competing for the export tire markets of the world, with comparative figures for the first nine months of 1933 and 1934, with percentage of change registered in the latter period, are as follows:

United States, 856,000 tires in the first nine months of 1933 and 935,000 in the corresponding period of 1934, 9% increase; Canada, 342,000 to 625,000, a gain of 83%; Germany, 94,000 to 112,000, a gain of 19%; Japan, 146,000 to 190,000, a gain of 30%; Belgium 452,000 to 427,000, loss of 6%; France, 591,000 to 431,000, loss of 27%; Italy, 461,000 to 331,000, loss of 28%, and the United Kingdom, 1,213,000 to 1,059,000 loss of 13%.

REVIEW SHELF

• Monthly Review of New Books, Pamphlets, Company Catalogs, Service Bulletins, House Organs, etc., Pertinent to the Industry.

HANDBOOK OF CHEMISTRY. Edited by Norbert Adolph Lange. Published by Handbook Publishers, Inc., Sandusky, Ohio. 1545 pp. $6.00. (Available from Book Department, THE RUBBER AGE.)

Compiled and edited by N. A. Lange, professor of organic chemistry at Case School of Applied Science and Western Reserve, assisted by Gordon M. Forker, this handbook represents an effort to present chemical information to meet the needs of the chemist who cannot command the unlimited time available to the research worker or who lacks the facilities of a large technical library. This effort is amply rewarded by the mass of technical information contained in the compilation in published form. Its hundreds of pertinent chapters range from "First Aid Measures for Accidents and Antidotes of Poisons" to tables relating the name, formula, weight and color of thousands of organic and inorganic compounds. It is a desirable addition to every chemical library where it should be treated as a "dictionary."

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RUBBER: ITS ANTI-OXIDANTS AND PRESERVATIVES. A bibliography compiled by the Science Library and the Research Association of British Rubber Manufacturers. Published by The Science Museum, South Kensington, London, S. W. 7, England. 82 pp. 5s.

Because of the number of rubber and chemical associations concerned in this compilation it represents the most complete bibliography of its subject that has yet been published. The volume, produced in mimeographed form to reduce the cost of preparation, includes some 1500 references, and is one of a series of bibliographies which have been prepared by the Science Museum touching on various branches of science and technology. The scope of this latest work comprises such subjects as the theory of anti-oxidants, storage of rubber, corrosion and deterioration, absorption of water and other liquids, action of light, preservation in general, and additional similar topics.

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INSULATION TESTING EQUIPMENT. Distributed by Sound Engineering Corporation, 416 N. Leavitt Street, Chicago, Illinois. 12 pp.

The four fundamental properties of insulators—dielectric strength, resistivity, dielectric constant and power factor—are defined clearly in this booklet which includes the results of various tests conducted with the company's insulation testing equipment. The various models and types of such equipment produced by the Sound Engineering Corporation are described and illustrated in the booklet.

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HANDBOOK OF THE RUBBER EXHIBITION AT THE SCIENCE MUSEUM, LONDON. Compiled by the Rubber Growers' Association. Published by His Majesty's Stationery Office, Adastral House, Kingsway, London, W. C. 2, England. 44 pp. 6d. net.

Published in conjunction with the opening of the Rubber Exhibition at The Science Museum in London, the purpose of this handbook is not only to enumerate the exhibits on view but to give an historical survey of the rubber industry and an account of the story of rubber from its source to the finished manufactured article. The handbook contains a series of concise treatises on various phases of rubber including: the history of rubber from its first recorded use before 1500 A.D. to the gradually increasing manufactured use of "wild rubber" and the modern plantation product including bulk latex; the chemical forms of rubber and its derivatives; various methods of planting, stocking, tapping trees and handling latex on plantations; details of many manufacturing processes; numerous uses of rubber; and the latest applications and uses of rubber due to modern scientific research.

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SKIDDING CHARACTERISTICS OF AUTOMOBILE TIRES ON ROADWAY SURFACES AND THEIR RELATION TO HIGHWAY SAFETY. By R. A. Moyer. Published by Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa. Bulletin 120. 128 pp.

All of the important phases of skidding related to highway safety were analyzed in this investigation including the relative importance of skidding as a cause of highway accidents. Coefficients of friction for new tread and smooth tread tires on wet and dry surfaces were measured for both straight ahead and sideways skidding at speeds of 3 to 40 miles per hour using a two-wheel trailer test unit. Tests were conducted on all types of roadways. Many tests are reported showing the effects of tire pressure, wheel loads, types of tire treads, and temperature. Standards of superelevation on curves for three classes of highways are given in the report.

JOURNAL OF THE RUBBER RESEARCH INSTITUTE OF MALAYA. Published by the Rubber Research Institute of Malaya, Kuala Lumpur, F.M.S. Vol. 5, No. 3 (September, 1934). 50c.

This issue of the Journal contains several articles on investigations carried out by the Chemical Division of the Rubber Research Institute, some of them in collaboration with other rubber organizations. It is pointed out by the Institute that a number of such investigations produced negative results, that is methods of treatment investigated did not produce any modification in the raw rubber to render it especially adaptable for the purpose in view. A few of the articles and their authors in this issue include: The Specific Gravity of Preserved Latex, by Edgar Rhodes; Rubber from Latex Coagulated with Sulphuric Acid, by G. Martin and W. S. Davey; and Rubber from Latex-Bitumen Mixtures, by G. Martin, W. S. Davey, H. C. Baker and Edgar Rhodes.

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PRODUCT DEVELOPMENT. Distributed by the Policyholders Service Bureau, Metropolitan Life Insurance Company, New York City.

Product development today is concerned not only with mechanical or technical excellence, but also with potential markets and qualities in the product that will meet the desires of the consumer. This report, latest in a series sponsored by the insurance company, deals with the entire subject of product development. It discusses the points to be considered before the development of a new product or the improvement of an old one. Actual cases are cited. While not applying directly to the rubber industry it gives excellent pointers on the whys and wherefores of product development. Both the Fisk Rubber and B. F. Goodrich companies contributed to the compilation of the report.

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RUBBER AND AGRICULTURE. Issued by The Rubber Growers' Association, 2 Idol Lane, Eastcheap, London, E.C. 3, England. 64 pp.

Although rubber cannot claim to be of direct assistance to the farmer in investigating the problems of the soil or plant growth it can be of material help as an accessory to those implements which prepare the soil for the reception of the seed or gathering the harvest. This booklet is a compilation of the varied and many different uses to which rubber is put in the agricultural field. Chapters are devoted to rubber equipment for tractors, movable floors for lorries, rubber for cow stalls, rubber in the dairy, rubber footwear, hose and belting, and miscellaneous uses of rubber in agriculture.

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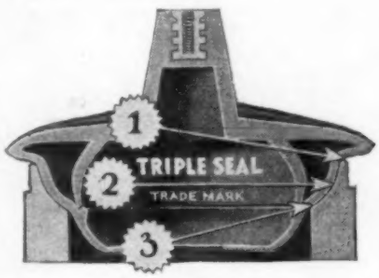
TRACTIVE RESISTANCE AS RELATED TO ROADWAY SURFACES AND MOTOR VEHICLE OPERATION. By R. G. Paustian. Published by Iowa State College of Agriculture and Mechanic Arts, Ames, Iowa. Bulletin 119. 64 pp.

This is a report and an analysis of motor vehicle tractive resistance and its separation into rolling resistance and air resistance. The relative merits of towing, decelerating, coasting, and direct methods of measuring tractive resistance are discussed. A complete description of the gas-electric drive test car used in the investigation, its equipment, and the direct testing procedure employed is given. The effect of speed and air temperature on tire temperature, and the effect of speed on the rolling radius of the tires are depicted.

New Rubber Goods

Triple Seal Tank Ball

Radiator Specialty Company, Charlotte, North Carolina, is now marketing a new and improved Triple Seal tank ball which makes a watertight contact in three distinct places within the toilet tank valve. A patented inner cone provides the extra triple protection. The compound from



which the Triple Seal ball is made contains 94% of rubber. The other materials are blended, milled and vulcanized so that these balls will resist the effect of water and the chemicals in water. Triple Seal tank balls, sold through plumbing and heating wholesalers, are guaranteed by the manufacturers for four years.

New Rubber Tired Wheels

A complete line of rubber-tired industrial wheels, known as "Vulc-On," specially designed to replace obsolete steel wheels on equipment already in service, has been introduced by the B. F. Goodrich Company, Akron. The new line gets its name from the fact that the rubber tire is permanently bonded to the wheel. This is accomplished by vulcanizing the rubber to the metal by the same process used in manufacture of solid truck tires. Made by this method, tires do not stretch or roll off the wheels. Tires are constructed of the Goodrich roller compound tread, which affords maximum cushion to floors and load. Under ordinary conditions they roll easier than a steel tire. Standard, cage type, anti-friction roller bearings are used in the one-piece metal wheels. Standard lubrication fittings are provided for.

Rubberized Carpet Padding

Goodyear Tire & Rubber Company, Akron, has added a rubberized hair carpet padding to its list of rubber products. Made of hogs' hair, over which a coating of compounded latex has been sprayed, the rubberized hair forms a light-weight padding more than ¼ inch thick. It is extremely resilient and does not slip on highly polished floors or scratch floor surfaces. The pad can be washed with soap and water and dried in a few hours. Grit and sand, said to be source of carpet wear, sifts through the porous pad, adding life to floor coverings. As the hair used is two inches or more in length and is rubber coated, it does not crumble into powder after continual wear and is therefore not a source of nasal irritation, physicians say. Special machinery shakes an even thickness of hair on a moving belt, where it goes slowly past workers who spray on the latex with special guns. After being sprayed on one side the pad is turned over and sprayed on the opposite side, allowing the latex to thoroughly coat the hair, after which it goes through a curing process before being shipped out in rolls of desired length.

New Goodrich Rubber Tape

A new type of rubber tape, to be known as Goodrich Mending and Electric Tape, recently has been announced by The B. F. Goodrich Company, Akron, manufacturers of Two-In-One Tape. Because the usual 110 volt current always has been considered a menace to life and property, building codes require that rubber tape for electric wire splices contain more pure rubber than is found in ordinary friction tape. Cotton cloth, a good conductor of electricity when moist, usually constitutes 60% of the content of friction tape. Goodrich Mending and Electric Tape is 90% pure rubber and a single thickness has tested to 8,000 volts. The new product has been tested and listed by the Underwriters' Laboratories and is expected to fulfill wide ranges of industrial and household use.

Lee "Knee Action" Tire

Lee Tire & Rubber Company, Conshohocken, Pa., has introduced a new model tire designated as K-90 produced especially for use on automobiles with sprung front wheels commonly known as "knee action" wheels. The company found that such wheels had certain effects on tire wear which required a variation in tire design because knee action tended to force tires over on their side walls in rounding turns, caused a hum from contact with the road and produced a tire squeal when brakes were applied. The result of experiments by Lee engineers to overcome

these defects resulted in K-90, a six-ply tire with stronger side walls and a semi-truss construction in the cords. The company claims danger of blow-outs from worn side walls has been virtually removed and that hum and squeal difficulties have been eliminated.

4-Snap Arctic Combination

Mishawaka Rubber & Woolen Mfg. Company, Mishawaka, Indiana, are featuring a new style spat-and-rubber combination, known as the 4-Snap Arctic, in

their new line of smart footwear, which is being extensively backed by national advertising. This style combination has a low cut rubber base, with a full size spat of jersey cloth. The spat portion of the combination comes in grey shades mostly. It is equipped with buttons, rather than with zippers, for merchandising purposes. The company still features the red ball trademark on its well known products.

Rubber Eliminates Door Noise

The Otis Elevator Company has developed a sheave type hanger equipped with molded rubber tires which eliminates door noise. This improvement will allay the nerve-wracking jangle which accompanies the closing of elevator doors not equipped with such type noise eliminators. Now doors can behave in a quiet and dignified manner in keeping with the modern quiet elevators which they complement. While the service life of this new equipment is acknowledged to be shorter than that of existing types, tests have shown that the rubber holds up through hundreds of thousands of satisfactory operations, and that tire replacement is readily accomplished. This new quiet sheave is well suited for adoption on doors which set up noises which in turn are amplified by reverberation of the car panels.

Rubber Wrapper Developed

Goodyear Tire & Rubber Company, Akron, has developed a new product, made synthetically from rubber, said to be equal in many properties to Cellophane, the transparent wrapping material introduced several years ago by DuPont. Although little information regarding the new item, which has been termed Pliofilm, has been vouchsafed by the company, it is believed that it goes cellulose one better by remaining moisture-proof when wrinkled or creased. It is also said to have greater elasticity and greater tear resistance than the transparent cellulose. Pliofilm, according to report, will cover 20% more area than Cellophane, and requires only moderate heat to produce a firm, permanent seal of two edges. Cellulose requires intense heat to accomplish the same effect.

Rubber Used as Adhesive

Specially treated rubber latex is now being used as an adhesive for fixing labels to tins, jars, bottles, and similar containers. The latex is used in place of the ordinary paste. One English manufacturer is said to be placing latex on the market in collapsible tube form for general adhesive work in the home.

MARKETS

RUBBER—COTTON AND FABRICS—CHEMICALS

NEW YORK, DECEMBER 8, 1934

Crude Rubber

PRICES moved in a 73 point range on the Exchange for spot rubber during the past 30 days. High was 13.31 on November 10; low was 12.58 on November 23. Today's price is 19 points below that of November 8, one month ago. Prices broke badly twice since our last report. Price for spot on November 14 closed at 12.75 on the Exchange, a loss of 43 points from the previous day. This drop was attributed to reports that the Dutch were offering heavy tonnages to the domestic trade. Setbacks in other commodities and easier price trends abroad resulted in a drop from 13.05 on December 1 to 12.87 on December 3, a loss of 18 points. Reports have been consistent that the Dutch are anxious to terminate the restriction agreement. This report has been equally consistently denied but resulted in slight flurries on the market. Prices on futures approximated one cent higher than spot prices up until October, 1935 deliveries. Quotations in the outside market, Exchange, London and Singapore follow:

As of December 8

Plantations—

Ribbed Smoked Sheets—			
Spot	—	@	.13 1/8
December	—	@	.13 1/8
Jan.-Mar.	—	@	.13 3/8
Apr.-June	—	@	.13 1/2
First Latex, crepe spot	—	@	.13 3/4
Amber Crepe, No. 2	—	@	.11 5/8
Amber Crepe, No. 3	—	@	.11 3/4
Amber Crepe, No. 4	—	@	.11 5/8
Brown Crepe, clean thin	—	@	.11 3/8
Brown Crepe, rolled	—	@	.10 1/8

Latex—

Liquid Latex, per gal	.55½	@	—

Paras—

Up-River, fine	—	@	.09¾
Acre Bolivian, fine	—	@	.10

Balata—

Block, Ciudad	—	@	.44

LONDON MARKET

Standard Smoked Sheets—Buyers—Dec. 8

December	—	@	6 3/16d
Jan.-Mar.	—	@	6 1/2d

SINGAPORE MARKET

Standard Smoked Sheets—Sellers—Dec. 8

December	—	@	5 15/16d
Jan.-Mar.	—	@	6 1/16d

Reclaimed Rubber

Interest in forward contracts for reclaimed rubber is light but consumption and percentage to crude continue to rise. The latest available percentage of reclaim to crude, that for October, was 26.1 compared to 23.2 in September. Reclaimers are optimistic for 1935 business and look for a decided improvement. Prices are unchanged since our last report, as follows:

High Tensile

Super-reclaim, black	.08¾	@	.09
High Tensile Red	.07	@	.07¼

Shoe

Unwashed	.06½	@	.06¾
Washed	.08	@	.09

Tube

No. 1 (Floating)	.13	@	—
No. 2 (Compounded)	.07¼	@	.07¾

Tires

Black	.05	@	.05¼
Black, selected tires	.05¼	@	.05½
Dark Gray	.06¼	@	.06½
White	.09¼	@	.09½
Truck, Heavy Gravity	.05½	@	.06
Truck, Light Gravity	.06	@	.06¼

Miscellaneous

Mechanical blends	.04¼	@	.04½

Scrap Rubber

The market for scrap rubber is comparatively dull at this writing, apparently being influenced by the coming holidays. Reclaimers have shown some interest in offerings but nothing active is expected before next month. Prices are slightly easier, as follows:

(Prices to Consumers)

Auto tire peelings	ton 16.00	@	18.00
Mixed auto	ton 8.00	@	9.00
Clean solid truck tires	ton 35.00	@	37.50
Boots and shoes	ton 20.00	@	21.50
Arctics, untrimmed	ton 16.00	@	17.50
Inner tubes, No. 1	lb. .06½	@	.06¾
Inner tubes, No. 2	lb. .03¼	@	.03⅜
Inner tubes, Red	lb. .02⅜	@	.02½

Cotton

Although contracts were scarce most of last month operators face the future with confidence. Today's closing price of 12.45 for December cotton is 29 points above that reported one month ago. Spot prices on Middling Upland Grade in the New York Market have increased from 12.25 on November 1 to 12.70 on December 8. Confidence for future trading is based on endorsement of the Administration of proposed amendments to the Bankhead Act under which growers having base production of 2 bales or less would be freed from payment of any tax levied under the measure; progress in the negotiating of agreements with foreign countries, particularly Germany and Russia; and the constant signs of improvement in the consumer goods industries. Estimated cotton crop on December 1 was reported at 9,731,000 gross bales of 500 lbs. each by the Department of Agriculture. Quotations for middling uplands on the N. Y. Cotton Exchange follow:

	Nov. 8	December 8		
	Close	High	Low	Close
December	12.16	12.44	12.44	12.45
March	12.29	12.58	12.52	12.54
May	12.27	12.57	12.53	12.54

Tire Fabrics

(Prices Net at the Mill—Process Tax Included)

Peeler, carded, 23/5/3	lb. .36½	@	—
Peeler, carded, 23/4/3	lb. .37½	@	—
Peeler, carded, 15/3/3	lb. .34½	@	—
Peeler, carded, 13/3/3	lb. .33½	@	—
Egyptian, carded, 23/5/3	lb. .47½	@	—
Egyptian, combed, 23/5/3	lb. .51½	@	—

CHAFERS

Carded, American, 1 1/16"	lb. .37	@	.39
Carded, American, 1"	lb. .31	@	.34

LENO BREAKER

Carded, American, 1 1/16"	lb. .37	@	.39
Carded, American, 1"	lb. .31	@	.34

Sheetings

Count	Width	Weight			
48x40	36 in.	5.50	lb.	—	@ .05½
40x40	36 in.	6.15	lb.	—	@ .04⅞
40x36	36 in.	6.50	lb.	—	@ .04⅝
48x48	40 in.	2.50	lb.	—	@ .11½
48x48	40 in.	2.85	lb.	—	@ .10
64x68	40 in.	3.15	lb.	—	@ .10⅜
56x60	40 in.	3.60	lb.	—	@ .08⅝
48x44	40 in.	3.75	lb.	—	@ .08⅜
44x40	40 in.	4.25	lb.	—	@ .07

Ducks

Enameling	lb. .32	@	.37½
Belting and Hose	lb. .34	@	—
Single filling, A grade	lb. .16¾	@	.17¼
Double filling	lb. .17¾	@	.18¼

Closing Rubber Prices on New York Commodity Exchange, Inc.

No. 1 Standard Contract of 10 tons

FROM NOVEMBER 9 TO DECEMBER 8

Date	Spot	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Sales
Nov. 9	13.25	13.22	13.29	13.41	13.51	13.62	13.72	13.81	13.91	14.01	14.11	14.22	14.32	——	147
10	13.31	13.30	13.37	13.49	13.61	13.73	13.82	13.91	14.01	14.12	14.23	14.33	14.43	——	104
11	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
12	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
13	13.18	13.17	13.24	13.36	13.47	13.58	13.68	13.78	13.88	13.99	14.09	14.20	14.30	——	107
14	12.75	12.73	12.80	12.90	13.00	13.10	13.19	13.28	13.39	13.50	13.60	13.71	13.81	——	615
15	13.00	12.98	13.05	13.16	13.26	13.37	13.46	13.55	13.66	13.77	13.87	13.98	14.08	——	377
16	12.88	12.84	12.91	13.01	13.09	13.18	13.27	13.37	13.47	13.57	13.67	13.78	13.88	——	252
17	12.88	12.84	12.91	13.01	13.10	13.20	13.30	13.41	13.51	13.61	13.71	13.81	13.91	——	54
18	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
19	12.75	12.70	12.78	12.80	12.92	13.04	13.16	13.28	13.37	13.46	13.56	13.66	13.76	——	288
20	12.70	12.64	12.71	12.79	12.90	13.01	13.11	13.21	13.31	13.42	13.52	13.63	13.73	——	778
21	12.50	12.39	12.48	12.58	12.68	12.78	12.87	12.97	13.07	13.17	13.27	13.37	13.47	——	460
22	12.68	12.64	12.71	12.81	12.91	13.01	13.12	13.23	13.33	13.44	13.55	13.65	13.75	——	464
23	12.58	12.57	12.64	12.75	12.85	12.95	13.07	13.19	13.29	13.39	13.48	13.58	13.68	——	310
24	12.94	12.89	12.96	13.06	13.18	13.30	13.40	13.50	13.60	13.70	13.80	13.90	14.00	——	256
25	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
26	13.06	12.97	13.04	13.13	13.24	13.35	13.48	13.62	13.72	13.82	13.92	14.03	14.13	——	484
27	13.06	12.97	13.04	13.17	13.27	13.39	13.49	13.60	13.71	13.83	13.93	14.03	14.13	——	605
28	13.18	——	13.18	13.30	13.40	13.50	13.60	13.71	13.81	13.91	14.01	14.12	14.23	——	623
29	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
30	13.18	——	13.16	13.26	13.35	13.45	13.55	13.66	13.76	13.86	13.97	14.09	14.19	——	330
Dec. 1	13.05	——	13.05	13.15	13.26	13.38	13.47	13.57	13.67	13.76	13.87	13.97	14.07	14.17	95
2	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——
3	12.87	——	12.89	12.99	13.11	13.23	13.34	13.45	13.54	13.63	13.73	13.83	13.93	14.03	139
4	12.98	——	12.98	13.08	13.19	13.31	13.40	13.49	13.59	13.69	13.79	13.89	13.99	14.09	184
5	13.00	——	12.99	13.09	13.20	13.32	13.42	13.52	13.61	13.70	13.80	13.90	14.00	14.10	235
6	13.06	——	13.06	13.20	13.30	13.40	13.50	13.59	13.69	13.77	13.88	14.00	14.10	14.20	352
7	13.07	——	13.07	13.21	13.31	13.41	13.50	13.60	13.69	13.78	13.89	14.00	14.10	14.20	159
8	13.06	——	13.02	13.15	13.24	13.34	13.43	13.52	13.61	13.71	13.81	13.91	14.01	14.11	128
9	——	——	——	——	——	——	——	——	——	——	——	——	——	——	——

Rubber CHEMICAL Markets

NEW YORK, DECEMBER 10, 1934

[All Quotations F.O.B. Works Unless Otherwise Noted]

ACCELERATORS

Organic			
A-1 (Thiocarbanilid)	lb.	.21 @	.25
A-5-10	lb.	.33 @	.36
A-7	lb.	.53 @	.65
A-11	lb.	.60 @	.75
A-16	lb.	.55 @	.65
A-19	lb.	.56 @	.75
A-32	lb.	.70 @	.80
A-17	lb.	— @	—
Aldehyde ammonia, crystals	lb.	.65 @	.67
Altax	lb.	— @	—
Captax	lb.		
Crylene	lb.	.55 @	.65
paste	lb.	.45 @	.55
Di-Ortho-Tolyguanidine	lb.	.46 @	.47
Diphenylguanidine	lb.	.36 @	.37
Ethylidene aniline	lb.	.45 @	.47½
Formaldenyde aniline	lb.	.37½ @	.42
Guantal	lb.	.42 @	.51
Heptene	lb.	.40 @	—
Hexamethylene-tetramine	lb.	.37 @	—
Lead Oleate, No. 999	lb.	.11 @	—
Witco	lb.	.11 @	—
Lithex	lb.	.18 @	.20
Methylenedianiline	lb.	.36 @	.37
Monex	lb.	3.25 @	—
Oxynone	lb.	.68 @	.80
Phenex	lb.	.50 @	.55
Pipsolene	lb.	3.55 @	4.00
R & H 40	lb.	.40 @	.41
R & H 50	lb.	.40 @	.41
R-2	lb.	1.55 @	1.90
Safex	lb.	1.20 @	1.25
SPDX	lb.	.75 @	—
Super-Sulphur No. 1	lb.		
No. 2	lb.		
Thiocarbanilid, drums	lb.	.21 @	.25
Trimene	lb.	.75 @	—
base	lb.	1.20 @	—
Triphenylguanidine	lb.	.58 @	.60
Tuads	lb.		
Ureka	lb.	.62 @	1.00
Ureka B	lb.	— @	—
Ureka C	lb.	.58 @	.69
Vulcanex	lb.		
Vulcone	lb.		
Vulcanol	lb.		
Z-88-P	lb.	.48 @	.60
Zimate	lb.		
Inorganic			
Litharge, domestic	lb.	.06½ @	—
Magnesia, calcined, heavy	ton	60.00 @	65.00

COLORS

Blacks (See Compounding Materials)

Blues			
Prussian	lb.	.36 @	.38
Ultramarine	lb.	.12 @	.15
Browns			
Sienna, Italian	lb.	.06 @	'13
Umber, Turkey	lb	.04 @	.04½
Greens			
Chrome, light	lb.	.20 @	.30
medium	lb.	.21 @	.31
dark	lb.	.24 @	.30
Chromium Oxide, bbl.	lb.	.22 @	.23
Reds			
Antimony			
crimson, 15/7	lb.	.46 @	—
sulfur, free	lb.	.48 @	.52
Indian English	lb.	.09 @	.10
Domestic (Maroon)	lb.	.11 @	—
Red oxide, pure	lb.	.10 @	.12
Rub-Er-Red, f.o.b. Easton	lb.	.09¼ @	—
Whites			
Cryptone CB, No. 21	lb.	.06 @	.06¼
Cryptone, No. 19	lb.	.06 @	.06¼
Lithopone			
Albalith, black label—11	lb.	.04½ @	.04¾
Azolith	lb.	.04½ @	.04¾
Rayox	lb.		
Titanium oxide	lb.	.17 @	.19
Titanox B	lb.	.06 @	.06½
Titanox C	lb.	.06 @	.06½
XX—20 Zinc Sulphide, bbls.	lb.	.11 @	.11¼
XX—86 Zinc Sulphide, bbls.	lb.	.11 @	.11¼
Zinc Oxide—American Process			
American Azo:			
ZZZ (lead free)	lb.	.06½ @	.06¾
ZZ (leaded)	lb.	.06¼ @	.06½
Horsehead Lead Free Brand:			
Special—3	lb.	.06½ @	.06¾
XX Red—4	lb.	.06½ @	.06¾
XX Red—72	lb.	.06½ @	.06¾
XX Red—78	lb.	.06½ @	.06¾
XX Red—103	lb.	.06½ @	.06¾
U. S. P.—X, bbls.	lb.	.12½ @	.12¾
Kadox, black label—15	lb.	.09⅜ @	.09½
Blue label—16	lb.	.08⅜ @	.08½
Red label—17	lb.	.07 @	.07¼
St. Joe, black label	lb.	.06½ @	.06¾
green label	lb.	.06½ @	.06¾
red label	lb.	.06½ @	.06¾
Zinc Oxide—French Process			
Anaconda, lead free	lb.	.06½ @	.06¾
Anaconda, selected lead free	lb.	.06¾ @	.07
Florence White seal—7 bbls.	lb.	— @	.10½
Green seal—8	lb.	.09⅜ @	.09⅝
Red seal—9	lb.	.08⅜ @	.08⅝
Yellows			
Chrome	lb.	.15 @	.16
Ocher, dom. med.	lb.	.01½ @	.02

BLACKS

Arrow "Aerfloted" Specification	lb.	.0535 @	.0825
Bone, powdered	lb.	.05½ @	.12½
Carbon, compressed	lb.	.0535 @	.0825
uncompressed	lb.	.0535 @	.0825
"Certified," Cabot	lb.	.0535 @	.0825
Spherons	lb.	.0535 @	.0825
"Disperso"	lb.	.0535 @	.0825
Drop, bbls.	lb.	.05½ @	.14
"Excello," compressed	lb.	.0535 @	.0825
"Fumonex"	lb.	.03 @	.07
"Gastex"	lb.	.03 @	.07
Lampblack	lb.	.07 @	.12
"Micronex"	lb.	.0535 @	.0825
"Supreme"	lb.	.0535 @	.0825
Thermatomic—"P 33"	lb.	— @	—
"Thermax"	lb.	— @	—
United "Dixie" & "Kosmos"	lb.	.0535 @	.0825

COMPOUNDING MATERIALS

Aluminum Flake	ton.	21.85 @	24.50
Ammonia carbonate, lump	lb.	.10½ @	.12
Asbestine	ton	14.00 @	15.00
Barium carbonate (98-100%)	ton	56.50 @	61.50
Barium Dust	lb.	.05 @	.06
Barytes	ton	22.20 @	—
Basofor	lb.	.04½ @	—
Bentonite	lb.	.02 @	.03
Blanc fixe dry f.o.b. works	ton	42.50 @	70.00
Calcene	ton	35.00 @	45.00
Catalpo (fact.)	lb.	.02 @	—
Chalk, precipitated			
Suprex white, extra lt.	ton	60.00 @	75.00
heavy	ton	45.00 @	55.00
Clay, Kaolin, domestic	ton	7.50 @	15.00
Aerfloted, Suprex	ton	7.50 @	10.00
Congaree	ton	9.00 @	—
Dark Blue Ridge	ton		
Dixie	ton		
Lexington	ton	10.00 @	22.00
McNamee	ton		
Par	ton		
Tensulite		15.00 @	—
Witco	ton	8.50 @	9.00
Cotton Flock	lb.	.10½ @	.18
Glues, extra white	lb.	.28 @	.30
medium white	lb.	.14 @	.19
Kalite No. 1	ton	30.00 @	55.00
Kalite No. 3	ton	40.00 @	65.00
Magnesium carbonate	lb.	.06½ @	.06¾
Mica	ton	65.00 @	80.00
Rottenstone (powdered)	lb.	.02½ @	.05
Soapstone, powdered	ton	16.00 @	22.00
Starch, powdered	cwt.	3.56 @	3.76
Talc, domestic	ton	12.00 @	15.00
Pyrax A	ton		
Whiting, commercial	ton	17.00 @	18.00
English Cliffstone	ton	33.00 @	43.00
Sussex	ton		
Witco	ton	15.00 @	—
Wood Flour	ton	18.00 @	30.00
Zinc Carbonate	lb.	.09½ @	.11
Zinc Stearate	lb.	.25 @	—

MINERAL RUBBER

Black Diamond	ton	27.00 @	—
Genasco, solid (factory)	ton	25.00 @	27.00
Hard Hydrocarbon	ton		
Parmr, solid	ton	21.00 @	26.00
Pioneer, MR, solid	ton		
Pioneer-granulated	ton		

WETTING AGENTS

Arkesklene	lb.	— @	—

SPECIALTIES

Aromatics—Rodo	lb.		
Para-Dors No. 5145	lb.	2.00 @	—
Sunproof	lb.	.35 @	.37½
Sponge Paste	lb.	— @	.80
Tonox	lb.	.56 @	.60

SOFTENERS

Acids			
Nitric, 36 degrees	cwt.	5.00 @	5.25
Sulfuric, 66 degrees	cwt.	1.60 @	1.90
Tartaric, crystals	lb	.26 @	—
Acids, Fatty			
Laurex	lb.	.15 @	.16
Stearex	lb.	.08 @	.12
Stearic, double pressed	lb.	.08 @	.12
Alkalies			
Caustic Soda, 76%	cwt.	3.60 @	3.75
Soda Ash, 58% C.L.	cwt.	2.52 @	—
Oils			
Corn, refined, bbls.	lb.	.08½ @	.08¾
Cottonseed, crude	gal.	— @	.04
Cycline Oil	gal.	.15 @	.28
Degras (c.l. 100 bbls.)	lb.	.02¾ @	—
Less c.l. (10-25 bbls.)	lb.	.03 @	—
Lots less than 10 bbls.	lb.	.03¼ @	—
Fluxrite	lb.	.05½ @	.06½
Palm Lagos	lb.	.03½ @	.03¾
Niger	lb.	.03¼ @	.03½
Para-Flux	gal.	.17 @	—
Petrolatum, light	lb.	.02 @	.02½
Pigmentaroil, tank cars	gal.	.16 @	—
in drums	gal.	.22 @	.23½
Pine, steam distilled	gal.	.64 @	.65
dest. dist., drums	gal.	.40 @	.45
Rosin Oil, cmpd.	gal.	.40 @	—
Rubtack	lb.	.40 @	—
Seedine, c.l.	lb.	.07¼ @	—
Tackol	lb.	.08½ @	.18
Witco Palm Oil	lb.	.05 @	—
Witco Softener (f.o.b. wks.)	gal.	.15 @	—
Woburn No. 8, c.l.	lb.	.06 @	—
Wobonite, c.l.	lb.	.05 @	—
Resins and Pitches			
Pitch, Burgundy	lb.	.05 @	.06
coal tar	gal.	.05½ @	.06
hardwood	ton	20.00 @	25.00
pine, 200 lb. gr. wt.	bbl.	6.00 @	—
Rosin, grade K, 280 lb.	bbl.	5.55 @	—
Pigmentar, tank cars	gal.	.16 @	—
in drums	gal.	.22 @	.23½
R. S. L. Resin	lb.	— @	—
Retort Pine Tar, drums	bbl.	12.00 @	13.00
Solvents			
Acetone, pure	lb.	.12½ @	.13½
Alcohol, denatured, methanol, No. 1 bbls.	gal.	.30½ @	.35½
Benzene, 90%	gal.	— @	.19
Bondogen	lb.	— @	—
Carbon, bisulfide	lb.	.05½ @	.06
Carbon, tetrachloride	lb.	.05¾ @	.08½
Dichlorethylene	lb.	.29 @	—
Dipentene, cml., drums	gal.	.40 @	.41
Dryolene (f.o.b. Okla.)	gal.	.10 @	.10½
Ethylene dichloride	lb.	.05½ @	.06½
Gasoline, steel bbls.	gal.	.16 @	—
Naphtha, solvent	gal.	.26 @	.31
Plastogen	lb.		
Rub-Sol (f.o.b. Okla.)	gal.	.09 @	—
Turpentine, spirits	gal.	.46½ @	.50½
dest. dist., drums	gal.	.39 @	.41
Waxes			
Beeswax, white	lb.	.34 @	.37
Carnauba, yellow	lb.	.37 @	.40
Ceresin, white	lb.	.10 @	.11
Montan, crude	lb.	.10 @	.11
Ozokerite, black	lb.	.24 @	.25
green	lb.	.26 @	.30
Paraffin (c.l.—f.o.b. N. Y.)			
Yellow crude scale	lb.	.03 @	—
White crude scale 124/126	lb.	.03 @	—
Refined, 125/127	lb.	.04¼ @	—

ANTI-OXIDANTS

AgeRite, Gel	lb.		
Powder	lb.		
Resin	lb.		
White	lb.		
Albasan	lb.	.70 @	.75
Antox	lb.		
B-L-E	lb.	.57 @	.60
Flectol-H	lb.	— @	—
Flectol White	lb.	— @	—
Flectol B	lb.	— @	—
Neozone	lb.		
Oxynone	lb.	.66 @	.90
Retardex	lb.	.35 @	.40
Stabilite	lb.	.57 @	.62
Stabilite Alba	lb.	.70 @	.75
VGB	lb.	.55 @	.60

MOLD LUBRICANTS

Cocoa Soapstock	lb.	.06 @	.08
Dipex	lb.	.06 @	.08
Rusco, f.o.b. Nitro	lb.	.12 @	.30
Sericite, f.o.b. N. Y.	ton	65.00 @	—
Soap Tree Bark, cut, sifted	lb.	.06 @	.08
Zip (Mold Wash)	lb.	— @	—

FACTICE

Amberex	lb.	.13¾ @	—
Black	lb.	.08½ @	—
White	lb.	.08 @	.12
Brown	lb.	.07 @	.11½
Duphax	lb.	.10 @	—

VULCANIZING INGREDIENTS

Sulfur Chloride, yellow (drs.)	lb.	.03½ @	.04½
Sulfur flour.			
Refined, 100% pure (bags)	cwt.	3.45 @	—
Commercial (bags)	cwt.	1.95 @	2.80
Telloy	lb.		
Vandex	lb.		

Crude Rubber
Latex and Guayule
Reclaimed Rubber
Tires and Tubes

STATISTICS OF THE INDUSTRY

Rim Production
Automobiles
Gasoline
Cotton Prices

U. S. Imports and Exports of Crude Rubber

YEARS	Gross Imports: Long Tons	Gross Imports: Total Declared Value	Gross Imports: Average Declared Value per pound Cents	Re-exports: Long Tons	Re-exports: Total Declared Value	Re-exports: Average Declared Value per pound Cents	Net Imports: Long Tons
1922	301,076	101,843,188	15.10	4,809	1,921,828	17.84	296,267
1923	309,144	185,060,304	26.72	8,772	5,672,319	28.87	300,372
1924	328,056	174,231,331	23.71	10,309	6,057,637	26.23	317,747
1925	396,642	429,705,014	48.36	14,827	19,847,753	59.76	381,815
1926	413,338	505,817,807	54.63	17,671	22,470,583	56.77	395,667
1927	426,258	339,874,774	35.60	27,775	24,735,488	39.76	398,483
1928	439,731	244,854,973	25.03	32,159	18,128,361	25.17	407,572
1929	560,084	239,178,783	19.15	36,485	16,868,733	20.64	523,599
1930	482,082	139,134,330	12.89	30,205	9,316,205	13.77	451,877
1931	497,138	72,918,949	6.54	25,595	4,255,472	7.42	471,543
1932	409,584	31,936,459	3.47	20,929	2,015,612	4.30	388,655
1933	407,817	44,034,064	4.82	20,537	2,601,352	5.65	427,280
1932:							
Oct.	35,096	2,436,522	3.10	1,059	98,022	4.13	34,037
Nov.	28,908	2,263,469	3.48	1,745	158,618	4.06	27,163
Dec.	31,384	2,360,061	3.34	770	66,165	3.98	30,614
1933:							
Jan.	29,822	2,213,828	3.03	1,403	109,916	3.49	28,419
Feb.	22,603	1,554,086	3.12	1,244	102,129	3.73	21,359
Mar.	27,936	1,867,657	2.98	1,127	86,216	3.42	26,809
April	20,240	1,291,136	2.85	798	70,111	3.92	19,442
May	26,002	1,694,963	2.93	1,842	189,451	4.59	24,894
June	22,900	1,780,495	3.47	1,276	156,168	5.46	21,624
July	44,625	4,293,111	4.29	1,419	219,945	6.92	43,206
August	44,257	5,391,709	5.44	2,205	302,132	6.12	42,052
Sept.	44,912	6,110,956	6.07	2,369	335,798	8.89	42,543
Oct.	44,474	6,115,330	6.14	2,669	397,167	6.64	41,805
Nov.	40,582	5,850,714	6.44	2,188	333,631	6.81	38,394
Dec.	39,461	5,869,556	6.75	1,888	293,690	6.94	37,573
1934:							
Jan.	47,963	7,403,123	6.89	1,975	352,116	7.96	45,988
Feb.	34,335	5,262,711	6.84	2,133	476,232	9.97	32,202
Mar.	41,119	6,765,173	7.34	2,947	583,313	8.83	38,172
April	43,841	8,232,746	8.37	2,814	588,453	9.18	41,027
May	48,494	10,001,239	9.21	2,389	544,212	10.17	46,105
June*	47,289	10,747,464	10.14	2,012	501,499	11.33	45,277
July	41,443	9,670,617	10.41	2,366	660,199	13.99	39,077
August	31,531	7,873,690	11.15	1,393	400,433	12.83	30,138
Sept.	31,074	8,293,859	11.92	1,665	474,446	12.72	29,409
Oct.	28,318	8,203,447	12.93	1,917	577,702	13.46	26,401

* Revised.

United States Imports of Guayule, Balata, Jelutong, Liquid Latex

(All Quantities in Long Tons)

	Guayule: Tons	Guayule: Dollars	Balata: Tons	Balata: Dollars	Jelutong: Tons	Jelutong: Dollars	Liquid Latex (1): Tons	Liquid Latex (1): Dollars
1924	1,356	536,392	464	568,456	6,165	1,237,100	2,157	864,059
1925	3,781	1,803,448	517	574,750	6,749	1,642,531	3,853	3,537,810
1926	4,305	2,562,096	354	327,213	7,263	3,127,757	3,388	4,680,386
1927	5,018	2,674,957	582	447,246	7,785	2,448,657	1,116	876,077
1928	3,075	1,755,685	731	430,855	7,552	2,540,059	4,167	2,185,579
1929	1,231	545,175	728	566,964	8,203	2,458,136	3,728	1,787,997
1930	1,096	347,388	501	422,684	5,907	1,403,244	4,449	1,506,804
1931	—	—	1,208	411,692	5,777	1,019,010	4,650	884,355
1932	—	—	708	147,403	4,607	616,596	5,085	601,999
1933	—	—	1,658	2,261,869	5,989	944,895	11,085	1,833,671
1933:								
Aug.	—	—	272	527,147	390	55,509	1,156	196,138
Sept.	—	—	65	30,738	761	149,296	1,343	267,516
Oct.	—	—	119	47,663	542	99,249	1,561	310,531
Nov.	—	—	31	11,252	626	125,160	1,239	282,065
Dec.	—	—	42	20,008	708	143,868	1,290	270,533
1934:								
Jan.	—	—	98	43,932	766	169,966	1,126	239,054
Feb.	—	—	68	36,346	453	102,471	885	193,732
Mar.	51	9,464	145	51,080	254	43,532	1,134	257,545
April	100	18,928	128	50,965	533	98,658	1,334	321,390
May	100	18,928	143	65,471	538	95,710	1,407	368,642
June	—	—	84	49,881	388	71,672	1,458	421,317
July	—	—	160	63,963	482	87,412	1,231	385,733
August	100	18,607	100	36,732	516	85,651	1,169	369,335
Sept.	—	—	48	14,415	259	47,542	936	312,967
Oct.	—	—	14	2,797	278	48,287	922	282,503

(1) Weight given in pounds of dry rubber contained in latex.

U. S. Consumption of Crude Rubber

(Rubber Manufacturers' Association statistics raised to 100 per cent—All figures in long tons)

Figures on Monthly Basis

	1927	1928	1929	1930	1931	1932	1933	1934
Jan.	31,518	34,403	43,002	36,194	28,557	29,648	21,661	40,413
Feb.	30,137	33,702	41,594	33,302	28,797	31,821	21,638	40,609
Mar.	36,141	35,688	44,730	35,540	32,788	29,505	18,047	47,097
Apr.	35,871	32,772	47,521	39,686	33,321	27,515	25,928	44,947
May	34,592	37,333	49,233	39,386	37,817	30,957	44,074	43,012
June	33,801	37,676	43,227	34,195	37,916	41,475	50,743*	40,241
July	29,219	37,407	41,526	29,508	31,397	29,976	49,614*	32,647
Aug.	33,460	42,927	38,274	30,850	27,586	23,721	44,428*	33,310
Sept.	27,214	39,882	34,707	25,515	23,638	23,847	35,281*	30,352
Oct.	26,790	40,857	34,800	27,516	22,277	22,286	31,543*	31,347
Nov.	26,792	37,461	27,659	23,691	22,943	23,231	29,162	.....
Dec.	25,492	31,232	25,531	21,687	21,409	18,015	29,087	.....
Tot.	371,027	441,340	469,804	375,980	348,986	332,000	402,485*	.....

* Revised.

Figures on Quarterly Basis

Quarter	1926	1927	1928	1929	1930	1931	1932	1933
Jan./Mar.	94,301	99,216	103,558	128,565	101,610	89,652	85,309	64,326
Apr./June	87,109	103,242	103,500	139,292	112,229	107,755	92,643	125,126
July/Sept.	93,793	89,210	117,573	113,746	85,261	83,632	72,523	132,406
Oct./Dec.	83,212	80,860	117,597	84,872	72,020	65,645	64,145	94,198
Totals	358,415	372,528	442,227	466,475	371,120	346,684	314,620	416,056

Note—The quarterly figures are generally regarded as the most authentic; the monthly figures may be accepted as preliminary.

Reclaimed Rubber in the United States

(All Quantities in Long Tons)

Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*	Year	Production	Consumption: Tons	Consumption: % to Crude	Stocks*
1924	80,079	76,072	22.4	.....	1929	218,954	226,588	48.4	27,464
1925	132,930	137,105	35.6	13,203	1930	157,967	153,497	40.8	22,000
1926	180,582	164,500	45.9	23,213	1931	133,351	124,126	33.9	19,257
1927	189,144	178,471	47.6	24,980	1932	75,608	77,504	23.4	16,354
1928	208,516	223,000	50.4	24,785	1933	99,560	81,602	19.9	20,746
1933:									
Jan.	5,301	4,811	21.0	16,262	July	12,049	10,317	20.8	a 14,108
Feb.	4,578	4,363	20.2	16,570	Aug.	11,708	9,446	21.2	a 15,037
Mar.	3,847	3,454	19.1	15,496	Sept.	10,435	7,862	22.3	a 15,869
Apr.	4,617	4,407	13.1	14,370	Oct.	9,466	7,212	22.9	a 17,748
May	8,366	7,770	17.4	13,734	Nov.	9,063	6,335	21.7	19,170
June	10,591	9,674	19.1	13,231	Dec.	9,539	5,951	20.5	20,746
1934:									
Jan.	9,828	7,000	17.3	24,263	July	9,446	8,175	25.0	24,926
Feb.	9,504	7,646	18.8	23,356	Aug.	8,160	8,493	25.5	24,607
Mar.	11,479	9,683	20.6	25,113	Sept.	6,974	7,028	23.2	24,540
Apr.	10,185	9,387	20.9	22,033	Oct.	8,145	8,167	26.1	24,511
May	10,848	9,500	22.1	22,887	Nov.	....	....	...	....
June	10,820	9,459	23.5	23,664	Dec.	....	....	...	....

* Stocks on hand at the end of month or year.
a Revised.
(Rubber Manufacturers' Association figures raised to 100%)

U. S. Consumption of Gasoline

(In Thousands of Barrels of 42 Gallons)

	1932	1933*	1934		1932	1933*	1934
January	26,038	26,397	29,416	August	35,706	37,400	38,933
February	25,378	23,320	25,048	September	33,828	34,580	34,877
March	29,597	28,123	30,528	October	32,680	33,022	37,544
April	31,234	29,791	32,735	November	29,895	30,312	.....
May	32,016	33,709	38,141	December	27,110	28,572	.....
June	39,489	37,699	36,296				
July	30,929	34,087	37,393	Total	373,900	377,003*	.....

* Revised on basis of final 1933 figures issued September 26, 1934 by Bureau of Mines.

Daily Spot Closing Prices of Ribbed Smoked Sheet Rubber—*New York Market, in Cents per Pound*

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	Ave.
1932																																
July	2⅝	—	—	—	—	2⅝	2¾	2¾	2¾	—	2⅝	2⅝	2⅝	2⅞	2⅞	2⅞	—	2⅞	2⅞	3	2⅞	—	—	—	3	3⅛	3⅛	3⅛	3⅛	3⅛	—	2⅞
August	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3¼	3⅜	3½	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	—	3⅜
September	4¼	4¼	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4⅛	4	3½	3½	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	4	3⅜	3⅜	4⅛	3⅜	—	3⅜
October	—	—	3⅝	3⅝	3⅝	3⅝	3⅝	3⅝	3½	3½	3½	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	—	3⅜
November	3⅛	—	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
December	3⅜	3⅜	3⅜	—	3⅜	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	3¼	—	3⅜	3⅜	3¼	3¼	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜	3⅜
1933																																
January	—	—	3⅜	3⅜	—	—	2⅛	—	3⅛	3⅛	3¼	3⅛	3⅛	3⅛	—	3	3⅛	2⅞	3	3⅛	3	3⅛	2⅞	3	3⅛	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	3
February	2⅛	2⅛	2⅛	2⅛	—	—	2⅛	—	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	2⅞	3⅛	3⅛	2⅞	3	3⅛	2⅞	3⅛	2⅞	3⅛	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	3
March	2⅛	3	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛	3⅛
April	2⅞	—	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞	2⅞
May	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜	4⅜
June	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜	6⅜
July	5½	6½	6⅛	—	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛	6⅛
August	7⅛	7⅛	8	7⅞	7	7	6¾	8	7⅞	7⅞	7⅞	7⅞	7⅞	8½	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝	8⅝
September	7⅛	—	—	—	7	7	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
October	7⅛	7⅛	7⅛	8	7⅞	8	8	—	—	—	7⅞	6⅞	6⅞	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛	7⅛
November	7⅛	7⅛	8	8¼	8	8¼	8	8½	8½	8½	8½	8½	8½	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾	8¾
December	9¼	9¼	—	9¼	9¼	8¼	9⅛	8½	8½	—	8½	8½	8½	8½	8¾	8¾	—	8¾	8¾	8¾	8⅛	8⅛	—	—	—	—	—	—	—	—	—	8⅝
1934																																
January	—	9	8⅛	9	9	9	—	8¾	8¾	8¾	8¾	8¾	8⅞	—	—	—	—	—	9⅛	9⅛	—	9¼	—	9¾	9¾	9¾	10⅜	10⅜	10	10	9⅜
February	9⅜	10½	9⅛	—	10¼	10⅜	—	10¼	10⅛	—	—	—	10⅝	10⅛	9⅞	9⅞	9⅞	9⅞	10⅜	10⅜	10⅛	10⅛	10⅛	10⅜	10⅛	10⅛	10⅛	—	10⅜	—	—	10½
March	10⅛	10½	10⅛	11⅛	10⅜	10⅜	10⅜	10⅜	11⅛	11⅛	11⅛	11⅛	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅞	11⅞	11⅞	11⅞	11⅞	11⅞	11⅞	10⅝	11⅛	—	—	11
April	11⅛	11¼	11⅛	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	11⅝	12	12	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛	12⅛
May	14¼	14⅛	14⅛	15	15⅛	15⅛	15⅛	15⅛	14	13¾	13¾	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝	13⅝
June	13	14⅛	14⅛	12¾	13¼	13¼	13¼	13¼	13⅛	13⅛	13⅛	13⅛	13⅛	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝	14⅝
July	14	14⅛	14⅛	—	14¾	14¾	14¾	14¾	14⅝	14⅝	14⅝	14⅝	14⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝	15⅝
August	14⅛	15	—	—	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛	15⅛
September	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
October	14½	13⅞	14	—	13⅞	13⅞	—	14	13⅝	13⅝	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
November	13⅝	13	—	13	—	—	13⅜	—	13⅝	13⅝	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
December	13⅛	—	12⅞	13	13	13⅛	13⅛	13⅛	13⅛	—	—	—	13¼	12⅞	13⅞	—	—	12¾	—	12¾	12½	12¾	12⅝	12⅝	12⅝	13⅜	13⅜	13⅜	13⅜	—	—	—	—

Average Spot Closing Prices—Ribbed Smoked Sheets

(New York Market)

Average Price per Pound for Years 1910-1929

Year	Cents	Year	Cents	Year	Cents	Year	Cents	Year	Cents
1910	206.60	1914	65.33	1918	60.15	1922	17.50	1926	48.50
1911	141.30	1915	65.85	1919	48.70	1923	29.45	1927	37.72
1912	121.60	1916	72.50	1920	36.30	1924	26.20	1928	22.48
1913	82.04	1917	72.23	1921	16.36	1925	72.46	1929	20.55

Average Monthly Price per Pound Since 1928

Month	1928 Cents	1929 Cents	1930 Cents	1931 Cents	1932 Cents	1933 Cents	1934 Cents
Jan.	40.25	20.14	15.24	8.34	4.38	3.08	9.32
Feb.	32.75	23.97	15.85	7.70	4.03	2.95	10.45
Mar.	26.82	24.55	15.34	7.71	3.35	3.01	11.01
Apr.	18.97	21.18	14.93	6.43	3.02	3.56	12.10
May	18.99	21.46	14.24	6.49	3.09	4.95	13.26
June	19.59	20.64	12.45	6.35	2.66	6.15	13.51
July	19.40	21.30	11.24	6.37	2.89	8.01	14.60
Aug.	19.46	20.59	9.96	5.38	3.63	7.31	15.47
Sept.	18.47	20.37	8.28	5.08	3.84	7.30	15.36
Oct.	18.83	19.67	8.20	4.87	3.65	7.64	13.96
Nov.	18.26	16.62	9.01	4.65	3.44	8.66	13.04
Dec.	17.97	16.12	9.05	4.64	3.24	8.87	....
Average for Year	22.48	20.55	11.98	6.17	3.49	5.96	....

London Closing Prices of Ribbed Smoked Sheets

(In Pence Per Pound)

Day	Sept.	Oct.	Nov.	Dec.	Day	Sept.	Oct.	Nov.	Dec.
1	—	7⅛	6⅛	6⅜	17	7⅜	6⅞	6⅞	—
2	—	7⅛	6⅞	—	18	7⅜	6⅞	—	—
3	7⅞	6⅞	6⅜	6⅞	19	7⅞	6⅞	6⅛	—
4	7⅞	7	—	6⅞	20	7⅛	6⅞	6⅛	—
5	7⅛	6¾	6⅞	6⅞	21	7⅜	—	6⅞	—
6	7⅜	6⅞	6⅜	6⅞	22	7⅜	6⅞	6⅞	—
7	7⅞	—	6⅜	6⅞	23	—	6⅞	6⅞	—
8	—	6⅞	6⅞	6⅜	24	7⅞	6⅞	6¾	—
9	—	6⅞	6⅞	—	25	7⅜	6¾	—	—
10	7⅞	6¾	6⅞	—	26	7⅞	6¾	6⅞	—
11	7⅞	6⅞	—	—	27	7⅞	6⅞	6⅜	—
12	7½	6⅞	—	—	28	7⅞	—	6⅜	—
13	7⅜	6⅞	6⅜	—	29	7¼	6⅞	—	—
14	7⅜	—	6¼	—	30	—	6⅜	6⅞	—
15	—	6⅞	6⅞	—	31	—	6⅜	—	—
16	—	6⅞	6¼	—					

Average Monthly Price Per Pound

Month	1931 Pence	1932 Pence	1933 Pence	1934 Pence	Month	1931 Pence	1932 Pence	1933 Pence	1934 Pence
Jan.	4.160	3.052	2.264	4.429	Aug.	3.385	2.654	3.811	7.401
Feb.	3.823	2.760	2.093	4.920	Sept.	2.524	2.485	3.728	7.409
Mar.	3.822	2.047	2.099	5.136	Oct.	2.898	2.425	3.957	6.806
Apr.	3.082	1.876	2.323	5.712	Nov.	2.890	2.518	4.096	6.294
May	3.035	1.825	2.966	6.207	Dec.	3.115	2.444	4.200	
June	3.082	1.750	3.392	6.245	Average for				
July	3.048	1.875	3.860	7.053	Year	3.155	2.434	3.233	

Spot Closing Cotton Prices

(Middling Upland Grade—New York Market)

Recent Daily Price Per Pound

Date	Oct.	Nov.	Dec.	Date	Oct.	Nov.	Dec.	Date	Oct.	Nov.	Dec.
1	12.50	12.25	12.75	11	12.65	—	—	21	—	12.55	
2	12.50	12.30	—	12	—	—	—	22	12.50	12.55	
3	12.40	12.30	12.65	13	—	12.60	—	23	12.50	12.55	
4	12.40	—	12.65	14	—	12.50	—	24	12.65	12.55	
5	12.45	12.30	12.80	15	12.50	12.55	—	25	12.55	—	
6	12.40	—	12.70	16	12.60	12.55	—	26	12.50	12.70	
7	—	12.50	12.70	17	12.60	12.55	—	27	12.50	12.69	
8	12.35	12.40	12.70	18	12.55	—	—	28	—	12.85	
9	12.25	12.50		19	12.50	12.55	—	29	12.45	—	
10	12.40	12.60		20	12.50	12.55	—	30	12.45	12.80	
								31	12.45	—	

Average Monthly Price Per Pound

	1931 Cents	1932 Cents	1933 Cents	1934 Cents		1931 Cents	1932 Cents	1933 Cents	1934 Cents
Jan.	10.27	6.65	6.23	11.25	Aug.	7.21	7.43	9.55	13.40
Feb.	10.96	6.85	6.05	12.28	Sept.	6.52	6.30	9.64	13.00
Mar.	10.90	6.86	6.39	12.30	Oct.	6.32	6.30	9.58	12.48
Apr.	10.19	6.16	7.02	11.80	Nov.	6.44	6.22	10.04	12.53
May	9.38	5.72	8.64	11.44	Dec.	6.25	6.00	10.17	
June	9.05	5.02	9.47	12.20	Average for				
July	9.28	5.87	10.76	12.84	Year	8.56	6.41	8.63	

World Stocks of Crude Rubber

ON HAND OR AFLOAT TO THE U. S.

At End of	ON HAND 1932	ON HAND 1933	ON HAND 1934	AFLOAT 1932	AFLOAT 1933	AFLOAT 1934	ON HAND AND AFLOAT 1932	ON HAND AND AFLOAT 1933	ON HAND AND AFLOAT 1934
Jan.	322,860	396,376	368,660	42,234	32,539	45,768	365,094	428,915	414,428
Feb.	318,936	381,794	357,094	51,728	32,898	53,063	370,604	414,692	410,157
Mar.	329,586	390,135	353,242	44,190	29,531	54,722	373,776	419,666	405,786
Apr.	336,957	382,167	351,981	40,387	30,745	56,251	377,344	412,912	408,232
May	336,719	364,623	351,329	50,453	43,342	57,921	387,172	407,965	409,250
June	334,657	333,954	358,149	43,079	63,608	46,698	377,736	397,562	404,847
July	333,729	326,609	364,883	37,894	57,435	45,869	371,623	384,044	410,752
Aug.	342,888	325,148	362,647	42,846	53,084	40,278	385,734	378,232	402,925
Sept.	346,154	334,637	359,667	46,188	57,255	38,831	342,892	391,982	398,498
Oct.	358,282	343,579	362,018	40,176	58,568	38,247	398,458	402,147	400,265
Nov.	360,386	353,852		40,879	57,140		401,265	410,992	
Dec.	379,000	364,541		38,360	55,606		417,360	419,147	

(Rubber Manufacturers' Association figures raised to 100%)

STOCKS IN GREAT BRITAIN

Stocks in London

(No. of Tons in Wharves and Warehouses, including Latex)

At end of	1932	1933	1934	At end of	1932	1933	1934
Jan.	67,166	36,481	38,570	July	48,842	41,178	50,490
Feb.	65,942	37,182	38,752	Aug.	47,079	39,480	48,953
Mar.	64,280	40,689	40,501	Sept.	44,942	39,237	56,103
Apr.	61,848	40,911	42,413	Oct.	42,327	37,101	63,079
May	56,089	41,998	42,190	Nov.	40,606	36,139	
June	51,009	43,032	45,674	Dec.	37,407	35,615	

At End of Recent Weeks

	First Saturday	Second Saturday	Third Saturday	Fourth Saturday	Fifth Saturday
1934					
May	41,815	42,908	41,900	42,118	
June	42,503	43,308	43,709	44,157	45,711
July	47,607	48,908	49,654	49,834	
Aug.	50,860	51,555	51,640	51,362	
Sept.	48,255	50,028	52,320	53,924	56,030
Oct.	57,272	59,469	61,043	62,058	
Nov.	64,232	65,728	67,109	67,088	67,901

Stocks in Liverpool

1934					
May	53,915	54,268	54,123	54,276	
June	54,103	54,294	54,327	54,228	54,161
July	54,966	55,141	55,749	55,556	
Aug.	55,467	55,681	55,757	56,343	
Sept.	56,383	58,006	58,182	59,028	57,477
Oct.	54,944	55,266	57,414	57,944	
Nov.	58,380	59,616	60,281	60,543	69,164

STOCKS IN PENANG AND SINGAPORE

(Stocks held by Dealers—Quantities in Long Tons)

End of	1931	1932	1933	1934	End of	1931	1932	1933	1934
Jan.	48,802	48,850	22,525	40,405	July	51,203	17,017	36,972	65,099
Feb.	49,283	46,954	21,530	41,884	Aug.	48,971	20,649	38,601	59,227
Mar.	49,590	46,591	24,594	47,933	Sept.	47,025	20,415	36,948	54,905
Apr.	45,868	39,663	25,460	48,431	Oct.	52,132	23,158	37,282	54,155
May	44,278	38,690	29,822	76,393	Nov.	46,947	25,419	39,018	
June	47,517	19,770	34,676	73,218	Dec.	45,795	25,341	38,269	

STOCKS IN OTHER CENTRES

End of: 1933	Malaya Mainland	Afloat for Europe	Holland	Colombo	Para and Manaos
Aug.	36,756	22,000	1,033	3,411	3,588
Sept.	36,083	25,900	1,107	4,286	3,288
Oct.	37,302	28,320	1,411	4,889	3,237
Nov.	36,965	38,530	1,285	5,575	3,383
Dec.	38,441	36,700	1,052	5,792	2,981
Jan., 1934	36,788	39,230	1,115	7,271	3,305
Feb.	39,630	36,563	906	5,366	3,420
Mar.	37,275	33,365	904	4,083	3,519
Apr.	33,765	32,640	905	4,070	3,624
May	7,213	39,370	897	3,066	3,556
June	20,243	36,870	902	3,533	3,273
July	27,235	35,430	1,263	4,683	3,094
August	30,507	36,060	1,322	5,713	2,849
Sept.	33,661	35,000	1,290	5,137	3,075
Oct.	31,762	35,000	1,401		

Rims Inspected and Passed in U. S.

(Tire and Rim Association Reports)

	Total		Total		Total
1924	21,863,311	1928	24,247,282	1932	6,261,336
1925	26,001,664	1929	24,141,502	1933	8,713,962
1926	24,199,524	1930	17,364,096	1934	
1927	19,700,003	1931	11,253,800	1935	

1934:		1934:		1934:	
January	789,274	May	1,140,132	September	526,472
February	1,262,311	June	1,015,730	October	629,878
March	1,651,548	July	1,155,024	November	577,715
April	1,635,722	August	752,074	December	

U. S. Tire and Tube Statistics[1]

(All Figures Represent Thousands)

AUTOMOBILE CASINGS

Figures for Recent Years

	1926	1927	1928	1929	1930	1931	1932	1933
Production	61,237	64,439	77,944	68,726	50,965	48,739	40,085	45,304
Shipments	59,002	64,059	74,296	69,395	53,638	48,151	40,260	44,094
Inventory [2]	10,456	10,264	13,624	11,838	9,003	7,775	7,644	8,888

Figures for Recent Months

	PRODUCTION 1932	PRODUCTION 1933	PRODUCTION 1934	SHIPMENTS 1932	SHIPMENTS 1933	SHIPMENTS 1934	INVENTORY 1932	INVENTORY 1933	INVENTORY 1934
Jan.	3,462	2,258	3,922	3,253	2,597	3,222	7,912	7,237	9,684
Feb.	3,871	2,339	4,335	2,553	2,292	3,285	9,172	7,377	10,725
Mar.	3,671	2,038	5,180	2,954	2,092	4,223	9,878	7,290	11,651
Apr.	3,517	3,123	4,470	3,698	3,654	4,438	9,846	6,778	11,981
May	3,820	5,189	4,456	4,258	5,180	5,332	9,379	6,760	11,127
June	5,643	6,100	4,342	10,065	6,305	5,228	4,999	6,615	10,219
July	3,617	5,714	3,353	2,404	5,497	4,157	6,203	6,844	9,437
Aug.	3,089	4,994	3,533	2,655	4,707	4,308	6,659	7,070	8,697
Sept.	2,539	3,999	2,936	3,082	3,503	3,183	6,096	7,595	8,419
Oct.	2,569	3,429		1,799	2,537		6,876	8,462	
Nov.	2,304	3,039		1,711	2,197		7,454	9,247	
Dec.	1,983	3,082		1,819	3,531		7,644	8,888	

AUTOMOBILE INNER TUBES

Figures for Recent Years

	1926	1927	1928	1929	1930	1931	1932	1933
Production	76,618	70,823	80,180	68,829	52,420	48,333	36,891	42,546
Shipments	71,591	72,896	77,127	70,592	54,938	50,021	37,911	41,391
Inventory [2]	16,200	13,692	16,117	12,807	9,999	7,922	6,749	7,815

Figures for Recent Months

	PRODUCTION 1932	PRODUCTION 1933	PRODUCTION 1934	SHIPMENTS 1932	SHIPMENTS 1933	SHIPMENTS 1934	INVENTORY 1932	INVENTORY 1933	INVENTORY 1934
Jan.	3,308	2,093	3,530	3,529	2,535	3,199	7,719	6,197	8,403
Feb.	3,281	2,224	4,077	2,728	2,102	3,323	8,760	6,357	8,445
Mar.	3,502	1,883	5,194	2,686	1,902	4,118	9,448	6,369	10,244
Apr.	3,225	2,853	4,735	3,385	3,051	4,342	9,441	6,189	10,585
May	3,820	5,189	4,359	4,258	5,180	4,902	9,379	6,760	10,043
June	5,279	5,448	4,097	9,019	5,778	5,309	5,174	6,097	8,795
July	2,937	5,603	3,531	2,160	5,211	4,323	5,975	6,440	8,053
Aug.	2,748	4,916	3,680	2,503	4,687	4,198	6,127	6,628	7,555
Sept.	2,601	3,827	3,110	3,098	3,472	3,024	5,753	7,008	7,639
Oct.	2,187	3,506		1,658	2,676		6,214	7,831	
Nov.	2,005	2,863		1,578	2,103		6,662	8,625	
Dec.	1,779	2,631		1,724	3,410		6,749	7,815	

(1) Rubber Manufacturers' Association figures, raised to 100%. The Association estimates its figures to be 75% complete up until 1929 and 80% complete for 1929-1933. Beginning 1934, the Association reported its figures to be 97% complete.

(2) Held by manufacturers at end of period indicated.

Automobile Production

	United States Total	United States Passenger Cars	United States Trucks	Canada Total	Canada Passenger Cars	Canada Trucks	Grand Total
1928	4,357,384	3,826,613	530,771	242,382	196,737	45,645	4,599,944
1929	5,358,420	4,587,400	771,020	263,295	207,498	55,797	5,621,715
1930	3,355,986	2,814,452	540,534	154,192	125,442	28,750	3,510,178
1931	2,389,730	1,973,090	416,640	82,621	63,477	19,144	2,472,351
1932	1,370,678	1,135,493	235,187	60,816	50,718	10,098	1,431,494
1933*	1,920,057	1,573,512	346,545	65,924	53,855	12,069	1,992,126
1933*							
Sept.*	191,800	157,376	34,424	5,808	4,358	1,450	197,608
Oct.*	134,683	104,870	29,813	3,682	2,723	959	138,365
Nov.*	60,683	42,365	18,318	2,291	1,503	788	62,974
Dec.*	80,565	50,789	29,776	3,262	2,171	1,091	83,827
1934							
Jan*	156,907	113,652	43,255	6,904	4,946	1,958	153,811
Feb.*	231,707	187,666	44,041	8,571	7,101	1,470	240,278
Mar.*	331,263	274,738	56,625	14,180	12,272	1,908	345,443
Apr.*	354,745	289,031	65,714	18,363	15,451	2,912	373,108
May*	331,652	273,765	57,887	20,161	16,504	3,657	351,813
June*	308,065	261,852	46,213	13,905	10,810	3,095	321,970
July*	266,576	223,868	42,708	11,114	8,407	2,707	277,690
August	234,809	183,500	51,309	9,904	7,325	2,579	244,713
Sept.	168,872	123,909	44,963	5,579	4,211	1,368	174,451
Oct.	132,488	84,503	47,985	3,780	2,125	1,655	136,268

* Revised.

Exports of Crude Rubber from Principal Producing Countries

(*Long Tons*

	BRITISH MALAYA [1]							DUTCH EAST INDIES [2]						
	Gross Exports	Imports	Gross Exports Minus Imports	Ceylon [2]	India & Burma [3]	Sarawak [4]	British North Borneo [3]	Siam [4]	Java & Madura	Sumatra E. Coast	Other D.E.I.	Indo-China [3]	Amazon Valley	All Other [5]	World Total [6]
1923	252,816	70,432	181,584	39,971	6,416	5,705	4,237	1,718	32,930	46,344	57,822	5,067	16,765	7,856	406,415
1924	259,706	108,524	151,182	39,997	7,657	6,699	4,621	2,962	42,446	54,497	80,347	6,688	23,165	9,065	429,366
1925	316,825	158,022	158,803	49,566	10,083	5,424	5,377	5,377	46,757	65,499	120,626	7,881	25,298	13,797	514,487
1926	391,328	151,243	240,085	58,962	9,874	9,155	6,079	4,027	52,186	71,413	121,231	8,203	24,298	16,017	621,530
1927	371,322	182,845	188,477	55,356	11,321	10,923	6,552	5,472	55,297	77,815	142,171	8,645	28,782	15,633	606,474
1928	409,430	149,787	259,643	57,267	10,790	10,087	6,698	4,813	58,848	82,511	121,770	9,548	21,129	10,690	653,794
1929	574,836	163,092	411,744	81,584	11,663	11,077	7,381	5,018	65,990	87,789	134,037	9,696	21,148	6,767	853,894
1930	547,043	133,876	413,167	76,970	10,782	10,309	6,781	4,251	69,755	79,396	115,254	7,665	14,260	5,651	814,241
1931	519,740	125,506	394,234	61,769	8,470	10,451	6,247	4,218	75,952	87,747	116,009	11,696	12,121	3,296	792,203
1932	478,252	92,539	385,713	48,973	3,888	6,960	4,664	3,451	61,312	79,837	85,871	13,883	6,450	1,816	702,818
1933:															
Jan.	46,599	7,857	38,742	4,602	318	590	458	305	4,766	5,630	6,840	1,957	554	125*	58,887
Feb.	37,564	6,167	31,397	5,064	304	541	458	368	4,895	5,119	6,081	895	620	125*	55,867
Mar.	42,059	7,964	34,095	4,905	389	571	458	304	5,092	6,466	6,999	1,102	995	125*	61,501
Apr.	36,752	7,758	28,994	4,582	272	624	583	235	5,226	5,969	8,147	1,122	556	125*	56,435
May	42,902	13,664	29,238	4,643	475	1,091	583	359	6,782	7,298	13,195	1,371	918	125*	66,078
June	41,411	16,538	24,873	5,198	377	1,149	582	632	7,352	6,654	14,779	1,369	704	125*	63,794
July	50,531	18,772	31,759	4,201	270	1,358	728	797	7,367	8,580	16,534	1,310	913	125*	73,942
Aug.	52,266	17,869	34,397	5,839	246	955	728	926	6,460	7,985	15,161	808	1,116	125*	74,746
Sept.	49,607	15,146	34,461	5,111	125	1,027	728	611	5,868	9,164	15,005	1,702	656	125*	74,455
Oct.	61,002	17,390	43,612	5,674	271	959	750	979	6,329	8,692	15,170	1,513	965	125*	84,879
Nov.	54,599	20,142	34,457	6,097	516	1,020	750	1,191	6,684	9,951	14,474	1,599	956	125*	77,820
Dec.	57,579	18,110	39,469	7,062	964	989	978	1,046	7,030	10,183	17,274	2,173	930	125*	88,223
1934:															
Jan.	55,055	21,184	33,871	7,551	1,531	1,197	805	1,290	6,513	8,974	17,718	2,158	576	125*	82,309
Feb.	57,867	19,688	38,179	8,354	775	1,005	805	1,264	6,706	10,277	17,466	1,100	831	125*	86,887
Mar.	58,515	26,470	32,045	6,954	1,412	1,360	806	1,363	8,655	12,043	25,064	1,316	846	125*	91,989
Apr.	56,748	27,963	28,785	5,783	762	1,447	894	1,311	7,282	11,324	24,054	1,519	440	125*	83,726
May	69,403	34,093	35,310	7,528	1,106	1,892	1,397	997	12,104	16,720	34,710	1,408	726	125*	114,023
June	53,282	20,981	32,301	3,305	1,425	1,886	644	1,497	4,860	6,078	15,216	1,504	765	125*	69,606
July	53,335	22,829	30,506	4,093	710	1,662	1,048	2,399	5,762	7,408	14,182	1,703	353	125*	69,951
Aug.	52,641	17,865	34,776	5,369	552	1,714	1,048	1,908	5,340	8,902	10,902	1,610	710	125*	72,956
Sept.	61,051	17,889	43,162	6,632	294	1,438	839	1,626	5,722	10,738	14,688	1,665	764	125*	87,693
Oct.	47,045	10,226	36,819	6,918	413	1,412	1,196	1,328	5,970	6,643	5,556	1,413			
Nov.	51,140	8,759	42,381	6,376											

(1) Malayan net exports cannot be taken as production, since imported rubber is largely wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 115 tons in 1923, 1,117 in 1924, 3,618 in 1925, 3,263 in 1926, 2,439 in 1927, 1,437 in 1928, 2,670 in 1929, and 1,274 in 1930. (2) Ceylon Chamber of Commerce statistics until 1926; rubber exported as latex is not included—such shipments were equivalent to 18 tons in 1923, 93 tons in 1924, 6 tons in 1925, 20 tons in 1926, about ½ ton in 1927, and 1 ton in 1928, and practically none in 1929, 1930 and 1931. (3) Official statistics. (4) Imports into Singapore and Penang. (5) Exports from "Other D.E.I." are chiefly wet native rubber, which is reduced about one-third in weight by remilling; rubber exported as latex is not included which on a basis of 3½ pounds per gallon amounted to 2,342 tons in 1923, 1,008 tons in 1924, 2,239 tons in 1925, 44 tons in 1926, 84 tons in 1927, 1,459 tons in 1928, 1,302 tons in 1929, and 2,656 tons in 1930. (6) Calculated from official import statistics of principal consuming countries, viz., United States, United Kingdom, France, Germany, Belgium and Netherlands, and includes guayule rubber. (7) This total includes the third column for British Malaya, "Gross Exports minus Imports," and all the figures shown for the other territories. * Figure is provisional; final figure will be shown when available.

Net Imports of Crude Rubber into Principal Manufacturing Countries

(*Long Tons*)

	United States [1]	United Kingdom	France (h)	Germany	Canada (ac)	Japan (da)	Italy	Russia (ce)	Australia (cd)	Belgium (d)	Netherlands	Scandinavia (abcdf)	Spain (g)	Czechoslovakia (abcd)	World Total
1919	238,407	42,671	17,685	5,584	6,395	9,753	9,894	75	1,002	3,995	2,771	3,149	2,418	9	343,808
1920	249,530	56,844	13,885	11,890	11,746	5,297	6,123	62	1,815	3,840	5,510	2,292	2,008	567	371,409
1921	179,736	42,087	15,135	21,920	8,124	21,713	3,906	165	1,014	1,705	1,022	1,279	2,245	569	300,620
1922	296,594	11,724	24,352	27,546	9,207	15,934	6,430	2,493	2,643	172	—3,807	1,778	589	567	396,222
1923	301,527	12,700	27,392	18,519	13,277	15,372	8,489	2,986	1,649	2,184	792	2,528	630	1,128	409,173
1924	319,103	—11,550	30,446	22,727	14,299	19,571	8,764	2,346	3,124	2,688	—807	3,178	944	1,370	416,203
1925	385,596	4,061	32,956	33,937	19,683	11,117	11,412	7,088	4,757	2,930	875	3,149	1,155	1,558	520,274
1926	399,981	84,865	34,240	22,775	20,229	18,125	9,809	6,529	9,021	2,498	2,670	4,046	1,299	1,870	617,957
1927	403,472	60,249	34,271	38,892	26,405	20,521	11,381	12,018	9,490	6,482	636	4,224	2,055	2,672	632,768
1928	407,572	4,846	36,496	37,855	30,447	25,621	12,433	15,134	8,430	7,958	2,243	4,418	3,178	3,138	599,771
1929	528,608	122,675	55,093	49,275	35,453	34,284	17,169	11,774	15,886	9,445	3,028	6,440	864	4,650	894,638
1930	458,036	120,069	68,503	45,488	28,793	33,039	18,639	16,387	5,354	10,635	2,924	7,710	2,400	4,468	822,445
1931	475,993	86,170	46,466	39,688	25,261	43,483	10,149	30,671	7,649	11,009	2,220	6,360	2,605	7,717	794,641
1932	393,844	44,086	42,506	45,121	20,917	56,027	14,469	30,637	12,576	9,519	2,851	7,262	4,359	9,444	693,618
1933	398,365	73,335	61,953	54,120	19,332	66,831	19,341	29,830	13,534	11,166	1,245	7,831	5,520	10,402	.....
1933:															
June	22,228	8,739	4,056	3,639	1,441	3,330	1,997	2,000	613	469	—519	772	541	400	49,706
July	43,824	3,961	3,774	4,103	1,192	1,460	1,146	2,952	2,347	299	16	486	435	287	66,282
Aug.	43,208	4,330	5,251	4,193	1,795	4,424	1,249	3,312	1,500	325	209	616	606	2,759	73,779
Sept.	43,886	4,341	4,111	5,841	2,620	5,369	2,055	2,168	794	864	189	604	790	577	74,211
Oct.	43,366	3,373	4,921	4,772	2,580	6,150	1,836	2,084	604	1,118	310	777	441	686	73,081
Nov.	39,633	3,955	5,419	4,086	2,184	6,296	942	4,483	301	1,129	222	878	493	882	70,903
Dec.	38,864	6,524	5,415	4,933	1,773	6,865	1,029	2,400	190	1,360	213	703	776	1,772	72,817
1934:															
Jan.	47,114	9,503	6,472	6,057	1,721	5,628	2,517	2,749	566	2,173	381	1,185	484	1,355	88,276
Feb.	33,087	10,785	5,301	5,490	1,854	4,570	2,388	3,399	950	1,538	287	464	656	516	73,357
Mar.	39,306	14,008	4,980	6,453	3,411	5,655	1,394	4,018	671	965	284	836	394	976	86,242
Apr.	42,262	9,999	3,210	6,701	2,419	5,679	1,966	1,326	415	504	262	1,217	752	465	77,177
May	47,412	9,786	3,634	6,499	2,218	6,905	2,218	4,360	769	214	322	940	142	1,768	87,192
June	46,785	16,564	3,803	6,171	2,208	6,745	1,887	3,145	1,512	837	331	843	1,146	1,624	93,601
July	40,308	12,266	4,051	5,494	2,430	5,739	708	1,640	732	810	540	1,602	747	1,094	78,161
Aug.	31,405	13,728	3,660	3,078	1,948	4,945	1,795	6,829	658	669	239	1,033	277	1,495	71,759
Sept.	30,345	11,254	4,244	2,607	2,770	7,346	1,486		743	501	339	980	465	477	
Oct.	27,323	18,897	3,424		3,043				798		447				

a—Including gutta percha. b—Including balata. c—Re-exports not deducted in monthly statistics. d—Including some scrap and reclaimed rubber. e—Official statistics of rubber imports by Soviet Russia. f—Including Norway, Sweden, Denmark and Finland. g—United Kingdom and French exports to Spain except in years prior to 1925. h—French imports have been reduced 12 per cent in order to eliminate imports of gutta percha and to reduce to basis of net weight. [1] United States imports of guayule are included in this compilation. * Figure is provisional; final figure will be shown immediately it becomes available.

A Section Devoted to Listings of Leading Producers and Distributors of Raw Materials, Machinery and Equipment, and Supplies for the Rubber Industry.

The Market Place

Chemicals and Compounding Materials — Machinery and Equipment—Crude, Reclaimed and Scrap Rubber—Fabrics—Rubber Products — Consulting Engineers.

Chemicals and Compounding Materials —

ACCELERATORS—
Ureka C—Ureka Blend B—Ureka.—A-1, A-7, A-11, A-16, A-19, A-32, Z-88, A-510, DPG
ANTIOXIDANTS — Flectol A, Oxynone
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IN this section are listed the products of the leading producers of materials and equipment used by rubber manufacturers.

When buyers refer to these pages for their needs, your name and address and a description of your products should be available here. The cost of a one-inch listing is only $5.00 per issue—the lowest cost of advertising space available in the rubber field.

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